

Master Thesis

Topic: Financial risk exposures in the Airline industry - case of South African Airlines

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Abstract

The airline Industry has been recognised as a high value industry. The market carrying over 2 billion passengers each year and occupied over 35% of global merchandise in trade by value¹. Studies have been conducted globally to investigate the feasibility and return on investment for local or international airlines, with several analytical methodologies in use. The focus of this dissertation is to analyse the impact of financial risk factors, including interest rate exposures, currency fluctuations, and fuel price changes on the airline industry. This study investigates risk exposures in the South African airline industry and uses data on South African Airways (SAA) and Comair to calculate the impact of risk factors on exposure significance.

The key results show that, on average, the exposures are more significant over the short-term horizons which becomes fundamental as the horizon length increases. In cases where the non-linear coefficient is slightly strengthened as the return horizon is lengthened, the sign of the exposure point coefficient does not necessarily point in the favourable direction of returns. Thus, a positive coefficient indicates a tendency of the risk factor and returns to move in the same direction, while a negative sign means that the impact on returns decreases as the exposure increases.

Based on the financial ratio analysis of the airline characteristics, the results indicate that SAA shows a better return on investment better than Comair. Particularly SAA (SAA Annual Report: 2005) shows an improvement in performance with an increase in

¹ Source: IATA (2006) research indicates that the airline industry carries over 2 billion passengers and 35% of global merchandise in trade by value.

revenues and stable cost bases, despite the unexpected increase in oil dollar prices by 42%, which contributes to a large increase in returns.

Lastly, structural changes in exposures are investigated, focusing on an extraordinary event of the global aviation industry the terrorist attack in New York on September 11, 2001. No impact on SAA or Comair was found during the study period, which indicates that our study subjects may be less risk impacted by U.S. influences in comparison to other international airlines.

The common financial speculation of higher risks are accompanied by higher returns may not be feasible to the airline industry, but strategic planning changes and future financial management adaptations to fit the global economy may bring a positive impact on the industry. This brings opportunities for further research.

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Special Thank You to Professor Carlos Correia who provides valuable comments and suggestions during my study period. Also to my family who support and encourage me all the way through.

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Chapter 1. Introduction

Chapter 1. Introduction

In comparison with non-international operating companies, the ones in an international business environment may face complex and multi-dimensional risk factors, resulting in either greater losses or profits for the organisation. In the aviation industry, airlines encounter extensive risks including strategic, financial, and operational risks, as well as unusual events. Strategic risks may lead the company in an erroneous direction as the result of inappropriate decision-making. Operational risks create potential losses from the transformation of revenue and resources, particularly the shift of the operational expenditures. Financial risks may produce uncertainty regarding future cash flows due to changes in global and domestic economic conditions and due to specific changes in operations and financing costs (Loudon, 2004).

In addition to the normal management risks, airline companies also have to deal with the extraordinary turbulence in their operational environment which may result in a negative impact on the financial statements. Global airline companies covering international routes may have more experience than domestic airlines in regards to the intense external pressures resulting from events such as the terrorist attacks on September 11, 2001; the Bali bombing; the declaration of the war in Iraq; and the outbreak of the SARS virus. However, the most important effect on operating results in recent times has been the deregulation of the industry combined with the effects of significantly higher fuel prices, which forms an important part of an airline's operating costs (Smyth and Pearce, 2006). Certain airlines have introduced fuel levies due to higher fuel prices. Further, the privatisation of airports has resulted in higher costs. In

addition, some airline companies have experienced major strikes by employees, resulting in significant daily operational losses. An external operational impact that airlines need to deal with is actual and potential competition from new entrants to the industry, which has resulted in lower prices and profits but not necessarily an increase in volumes. All of these factors indicate the potential for large losses if airline companies are incapable of managing these risks promptly, and the results of these risk factors reflect explicitly and significantly on the annual financial statements of the airline companies.

This study examines the critical financial exposures of the airline industry and the impact of these exposures on the two major airlines in South Africa. There are three specific financial risk factors that airline companies normally emphasise in relation to daily operations: interest rates, foreign exchange rates and fuel prices, which maybe hedged with an appropriate instrument. For example, Qantas Airways in Australia stated that their financial performance is subject to interest rate, foreign currency, fuel price and credit risks² (Note 32, Qantas Annual Financial Report, 2003). Another note in the financial report mentioned that Qantas “manages these risk exposures using various financial instruments”. Similar evidence is contained in the annual reports for Air New Zealand and South African Airways³. The common hedging instruments which international companies often use include interest rate swaps, forward rate agreements, and options to manage interest rate risk; cross-currency swaps, forward foreign exchange contracts, and currency options to manage currency risks; and options and

² Credit risk exposure is not analysed in this paper.

³ Similar statements are found in the annual report for Air New Zealand and South African Airways.

swaps⁴ on aviation fuel and jet kerosene to manage fuel price risks. Thus, it is crucial for directors to manage these key financial risk factors and to integrate them with other risk management instruments, as part of the core corporate finance function of the company.

The aim of this dissertation is to conduct a study of the financial exposures to these three major financial factors confronting South African Airways (SAA), the dominant airline company in South Africa; and Comair, a Johannesburg Stock Exchange (JSE) listed airline company. The methodology use in the current study follows the research study model published by Loudon (2004) on Qantas and Air New Zealand in Australia and New Zealand, respectively. By using the same method of analysis, this study investigates the impact of interest rate changes, currency fluctuations, and fuel price exposures on SAA, which is the leading international and domestic airline company in Africa; and Comair, which is currently operating under the brand names of British Airways and Kulula.com in both domestic and international routes.

This study also considers the volatility and variety of trends in interest rates, currency values, and fuel prices throughout the period under analysis. These include exposure to the foreign currency exchange rate fluctuations (especially with the Rand falling to a level of ZAR 14 to USD 1 and appreciating to ZAR 5 to USD 1 from 2001 to 2004) and the consistent increase in fuel prices (data reflected in 1997 of USD 9.40 per barrel increased to USD 67.40 in 2005). The abovementioned financial events have caused

⁴ Swap contract, as an exchange of streams of payments over time according to pre determined terms and conditions, allows Airline to pay or receive the difference between the agreed fixed price and the floating market price calculated on the notional amounts of such contracts.

airlines to experience financial losses in recent financial years, as those factors cannot be controlled by management.

Several studies (Carter, Rogers, and Simkins, 2002 and Di Iorio and Faff, 2001, and Bartram, 2002) have included tests for the existence of a single extra-market risk⁵, and most of these studies are based on exchange rate analysis or interest rate exposures, as these factors have been largely used for financial corporations. Most of these papers focused on the aggregate performance of the industries or a wide spectrum of the individual companies, without controlling for industry effects. In order to integrate the effects of these exposures, this study in contrast, investigates interest rate, currency, and fuel price exposures simultaneously. This is because analysing the foremost companies within a single industry in a specific context may provide a better and more practical incremental knowledge of the impact of the financial risk exposures on the companies. The instability of foreign exchange rates and interest rates as a result of the South African Reserve Bank's policies, as well as the increase in the fuel prices caused the airlines under study to operate with increased financial difficulties. This is important in the analysis of the continued existence and relevance of financial risk exposures.

Before the commencement of the study, it is inevitable to notice that SAA has a vulnerable financial structure, which causes its financial system to be sensitive to the major economic factors. SAA experienced a series of financial losses during the period under review and one of the reasons for its continued existence is due to the reluctant

⁵ Analysis of financial impacts based on a single risk factor.

financial support offered by the government via the Transnet group⁶. Under such conditions, it may therefore be rational to predict a greater significant influence on the risk coefficients within SAA than Comair.

This study focuses on the significance of returns in the presence of the three major financial exposures in relation to the short- and long-term horizon frames of SAA and Comair. The main results from this study indicate that there are significant influences on the financial exposures over the equity of SAA in both the short- and long-term horizons. The reason is that the losses on the shareholders' investments in the airline result in high sensitivity to the financial exposures. The significance levels of the risk exposures on the market value of Comair are distinctive, as the currency exposure shows a significant influence in the short-term but no significant influence in the long-term. Conversely, interest rate and fuel price levels are significant in the long-term period, but not in short-term horizons. A possible explanation for this is that Comair is better able to manage their short-term exposures. An additional finding of this study, and in contrast to the findings of the other airline studies, is that the extraordinary events of September 2001 had no substantial impact on the subject airlines' returns, nor on the major economic factors. This shows that South African airlines are impacted less significantly by the United States' aviation disastrous events.

Later in this study, Chapter 2 summarizes the historical background of SAA and Comair, as well as their current financial status and forecasted strategic projections. Chapter 3

⁶ The financial support provided by the government to SAA has also impacted the company's financing of planes. Increasingly, SAA is using "operating" leases to finance the investment in new planes. This is resulting in an increased level of financial leverage, although most of these leases represent off-balance sheet financing.

presents a review of current academic studies, which provides a theoretical analysis of financial risk exposures in the airline industry. Chapter 4 describes the data collection and data analysis methodology employed, including global airline performance to provide a better understanding of the industry and a comparison to our study subjects. Chapter 5 illustrates the results of the analysis and reports on the significance of the effect of the exposures. Chapter 6 displays the results of this study and compares these results to the study by Loudon (2004). Lastly, Chapter 7 concludes the research with relevant managerial information and acknowledgements.

Chapter 2. Histories of the airlines

Chapter 2. Histories of the airlines

As uncontrollable global economic factors affect all corporations to a certain extent, it is important for this study to present a detailed and specific analysis of the exposure effects on the airline industry. It is also essential to provide the historical background of the companies - SAA and Comair - and to highlight selected financial decisions⁷ in order to present a better understanding of the financial performance and operational directions of the companies.

Table 1 below provides the descriptive data for our study subjects. This table shows basic operational and financial comparative data for both SAA and Comair. Number Revenue Passengers indicates the number of revenue-generating travellers. Passenger Revenue represents the direct revenue generated by the company solely from the transportation of passengers. Total operating fleet shows the total number of the operating fleet before the balance sheet date, excluding future orders. The Turnover Revenue figure includes both domestic and international sales and is presented in South African Rand after converting the portion of Foreign Sales with the corresponding exchange rates. Headline Earnings per Shares (HPS), Net profit or Loss and Earnings per Shares (EPS) highlight the basic data of the airlines' financial performance. Comparison of Earnings to Revenue is calculated by dividing Net Profit by Sales Revenue to indicate Net Margin Line for both airlines.

⁷ Both SAA and Comair have adopted the International Financial Reporting Standards from 2006. For the period under review, SAA and Comair applied accounting policies in accordance with South African GAAP standards.

Table 1 Performance highlight of SAA and Comair (1998-2005)

Year	1998	1999	2000	2001	2002	2003	2004	2005
SAA								
No. Revenue Passenger (thousand)	5,081	5,291	5,793	6,129	6,128	6,520	6,510	6,851
Passenger Revenue (R million)	na	na	na	8,889	11,178	13,688	12,926	13,163
Total operating fleet	46	46	46	46	62	64	65	73
Turnover Revenue (R million)	6,891	8,142	9,263	10,839	13,664	16,324	15,338	15,554
Net profit/loss (R million)	(302)	10	349	408	2,144	(5,977)	(8,610)	966
Headline earnings/(loss) (R Million)	(289)	(269)	(32)	(735)	2,220	(5,985)	(4,820)	1,132
Headline earnings/(loss) per share (cents)	(9.1)	(8.6)	(1.02)	(24)	71	(191)	(166)	13
Earnings/(loss) per share (cents)	(9.7)	0.3	11.17	13	69	(191)	(296)	11
Earnings/(loss) to Revenue	(4.38)	0.12	3.77	3.76	15.69	(36.61)	(56.14)	6.21
Panel B: Comair								
No. Revenue Passenger (thousand)	na	na	na	na	na	na	na	na
Passenger Revenue ⁸ (R million)	514	609	977	1,160	1,285	1,366	1,475	1,714
Total operating fleet	na	na	na	17	17	18	20	22
Turnover Revenue (R million)	514	609	977	1,160	1,285	1,366	1,475	1,714
Net profit/loss (R million)	62	94	120	93	15	(23)	(97)	76
Headline earnings/(loss) (R Million)	67.43	93.66	120	97.44	15.96	28.56	50.82	72.66
Headline earnings/(loss) per share (cents)	16.9	22.3	28.6	23.2	3.8	6.8	12.1	17.3
Earnings/(loss) per share (cents)	16.9	19.5	28.6	23.2	3.8	(5.7)	(24.2)	19
Earnings/(loss) to Revenue	12.06	15.44	12.28	8.02	1.17	(1.68)	(6.58)	(4.43)

*Source: Annual Financial Reports of SAA and Comair from 1998 to 2005.

Inevitably, SAA, which is the larger airline with the larger fleet, generates more revenue and passengers, than Comair, due to the financial support from the government

⁸ Comair states that the turnover is based on the provision of transportation services to passengers on an accrual basis in the period in which the services are rendered.

and its long history. However, the net losses for SAA were enormous on a comparative basis when both airlines performed dreadfully in 2003 and 2004. From the investors' and shareholders' perspective, Comair's performance was overall superior to that of SAA, with higher returns in HPS, EPS and Earnings to Revenue.

From turnover revenue and net profit or loss, SAA shows higher proportion of expenses than Comair, which results in great net losses even though the revenue generated is high. Possible large expense accounts are salaries and wages, jet fuel costs and aircraft lease costs. In conjunction with the financial risk exposure studies, the number of aircraft plays an important role in airline operations.

Table 2 below details the numbers and types of aircraft for SAA and Comair. Although SAA shows larger number of fleets, the Asset Turnover Ratios⁹, however, are less soundly compare to Comair's results. This indicates SAA performs worse in terms of generating revenue from asset utilization perspective, i.e. the airline may have not utilizes its capacity to the fullest. The table shows that SAA operates internationally to a much greater extent than Comair, it is more hedged to currency risk as a greater proportion of its revenue is denominated in US dollars.

More aircraft are needed in the future by purchasing, leasing, or upgrading, which increases the importance of asset management. From an operational perspective, different strategic financing solutions need to be applied to our study subjects in order to produce more effective asset utilizations.

⁹ Asset utilization Ratio is used to compute comparable efficiency-of-utilization, or turnover, ratios for different categories of assets.

Table 2 Numbers of Aircrafts for SAA and Comair (2001-2005)

Year	2001	2002	2003	2004	2005
Panel A: SAA					
Boeing 737-200F	na	2 (0)	na	2 (0)	2 (0)
Boeing 737-200Adv	na	20 (0)	na	15 (0)	10 (0)
Boeing 737-800	na	16 (0)	na	21 (0)	21 (0)
Boeing 767-200	na	2 (0)	na	0	0
Boeing 747-SP	na	3 (3)	na	1 (1)	2 (2)
Boeing 747-200	na	5 (5)	na	0	0
Boeing 747-300	na	6 (3)	na	3(3)	3(3)
Boeing 747-400	na	8 (3)	na	13 (5)	13 (5)
A340-200	na	0	na	5 (0)	6 (0)
A340-300	na	0	na	1 (1)	6 (3)
A340-600	na	0	1(0)	7 (6)	7 (1)
A330-200	na	0	2(0)	2(0)	0
A319-100	na	0	0	0	8 (0)
Total	62 (23)	62 (14)	64 (15)	65 (14)	73 (17)
Aircraft carry value (R' million)	3,677	4,107	1,1034	6,164	8,304
Asset Turnover Ratio	2.95	3.33	1.48	2.49	1.87
Panel B: Comair					
Boeing 727-200	6	0	0	0	0
Boeing 737-200	11	0	0	10 (6)	8 (6)
Boeing 737-236	0	2 (2)	0	0	0
Boeing 737-400	0	3	0	3 (0)	3 (0)
Boeing 737-300	0	na	0	3 (3)	5 (5)
MD82	0	na	0	4 (0)	6 (0)
Total	17(10)	17	18	20	22
Aircraft carry value (R' million)	291	317	276	325	400
Asset Turnover Ratio	3.99	4.05	4.95	4.54	4.29

* The number of airline owned aircrafts is presented in brackets

* Source: Annual Financial Reports of SAA and Comair from 2001 to 2005..

2.1 South African Airways (SAA)

SAA, as a leading and stated-owned airline, is currently based in Johannesburg and services more than 40 destinations, with more than 6.5 million passengers annually.

2.1.1 History

SAA was established in 1934 when the South African government acquired the assets and liabilities of a private airline, Union Airways. A new national airline, South African Airways, was created as the aviation arm of the stated-controlled transportation network together with South African Railways and Harbours (SAR&H). In 1999, SAA ceased to be a division of what had by then become Transnet and was incorporated as a company in its own right, South African Airways (Pty) Limited (www.flysaa.com).

A milestone occurred in 1994 as SAA introduced a premium rewards programme, Voyager, to encourage travellers to select SAA as their first choice in air transport. Through the programme, passengers obtained awards after accumulating a certain number of air miles. Since Voyager was launched, SAA has 1.8 million customers in its database, which generates nearly 26% of its total revenue (SAA Annual Financial Report, 2005). The average ticket price of a Voyager member is greater than the airline average and results in a higher ratio of travel in business and first class.

In order to react promptly to the potential risk factors we have mentioned, SAA has access to funds on an annual basis in order to strengthen its strategic action in response to the risks highlighted by the company. The latest accessible fund indicated in the 2005 Annual Report of SAA shows R4 billion compulsory convertible subordinated loans obtained from Transnet. This figure includes an amount of ZAR 2, 4 billion¹⁰ which

¹⁰ The conversion of R2, 4 billion of the loans to equity is expected to restore SAA to solvency, and lifts the necessity for a subordinated loan, and facilitates the settlement of the remaining R1, 6 billion to

needs to be recapitalized proportionally. There are several other decisions made by management to improve the operations and turn the continuous losses into profits, thus, it is essential for the current study to note certain operational highlights, occurring during the period of our study, as well as their impact on the financial statements.

2.1.2 Accounting policies

Accounting policies have been applied in accordance with South African Statements of Generally Accepted Accounting Practice (“GAAP”), which are consistent with prior years except for the policy on maintenance costs¹¹.

By following GAAP, SAA accounts for all derivative financial instruments on a mark-to-market basis. Derivative financial instruments, which include currency and commodity forward contracts and options as well as interest rate swap agreements, are recognised in the financial statements on inception. Changes in the fair value of derivative financial instruments which are designated as effective hedges of future cash flows relating to firm commitments and forecasted transactions are recognised directly to equity. Changes in the fair value of derivative financial instruments that do not qualify for hedge accounting are recognised in the income statement as they arise.

Transnet debts.

¹¹ SAA expensed all maintenance costs as and when incurred. From April 1, 2001, SAA has expensed maintenance costs that are contractually required when paid and maintenance costs that are not contractually required as and when incurred. The effect of the change in the accounting policy amounted to a reduction in EBIT of R114 million in 2002, and the results are not adjusted as the effect is regarded as not material.

In compliance with the requirements of the accounting statement AC128: Asset impairment, SAA has changed the basis of the valuation of its owned aircraft from the historical value to realisable market value in US dollar terms. The result of changing the accounting policies leads SAA to record impairment losses annually¹².

An important risk management board was established to monitor credit, financial, operational, and exchange risks. As part of the strategic planning team, this committee filters out possible threats to the company and provides effective solutions.

2.1.3 Financial highlights

It is crucial to understand the composition of the financial structure of SAA and its main components. As its core business is serving the public as the government-owned airline transport company in the country, its revenues are mainly generated from passenger airline revenue¹³, cargo delivery, technical services, Voyager revenue and commission received, interest income and income from leased assets, insurance recoveries, and the release of unutilised air tickets. Key initiatives for the revenue stream mainly focus on the alliances agreement and co-share network development with other airlines in the international market and cargo business operations.

The operating costs mainly constitute fuel costs, repairs and maintenance, labour,

¹² SAA recorded impairment losses of R3 554 million in 2004 and R35 million in 2003, as partially resulting from the fluctuating exchange rate (Transnet Financial Report 2004).

¹³ The 2004 Financial Report states that passengers contributed over 79% of total revenue, of which more than 58% was from international travellers. This shows that SAA is partially hedged against currency movement, as nearly 58% of its revenue is denominated in foreign currency.

maintenance material costs¹⁴, outsourcing of IT support, in-flight entertainment costs,¹⁵ and lease charges (operating and finance leases) on the aircrafts.

The instability of the Rand impacts on the financial performance of SAA is severe, especially because most of the financial transactions are US dollar denominated¹⁶. From a cash flow perspective, more foreign currency outflows occur than inflows, which decrease the value of revenue. The operating profit is negatively and significantly impacted by the declining Rand, as accounted for under SAA's current accounting policies, in relation to its net foreign monetary assets and sometimes in relation to derivative financial instruments.

Although a continuous increase in shareholder value is a difficult task for global airlines, SAA showed sound performance by reaching a positive net asset value of ZAR 2, 228 million (Appendix 1) in 2005, after two consecutive years of serious losses¹⁷. In contrast, the Net Asset Value of SAA fell from a positive ZAR 6,028 million to a negative Net Asset Value of ZAR 1,410 million in 2003 due to the over ZAR 6,4 billion losses on its derivative positions and translation losses incurred in 2003. In addition to Appendix 1, Net Assets deployed by SAA, an additional financial highlight of SAA is outlined in Figure 1 below, being Total Income generated by SAA. This graph shows a constant growth in revenue from 1998 to 2005 except a minor decrease in 2004 of 6.4%,

¹⁴ SAA has the largest maintenance centre in Africa and, on average, engine maintenance accounts for 50% of maintenance costs (SAA Annual Financial Report: 2002-2005).

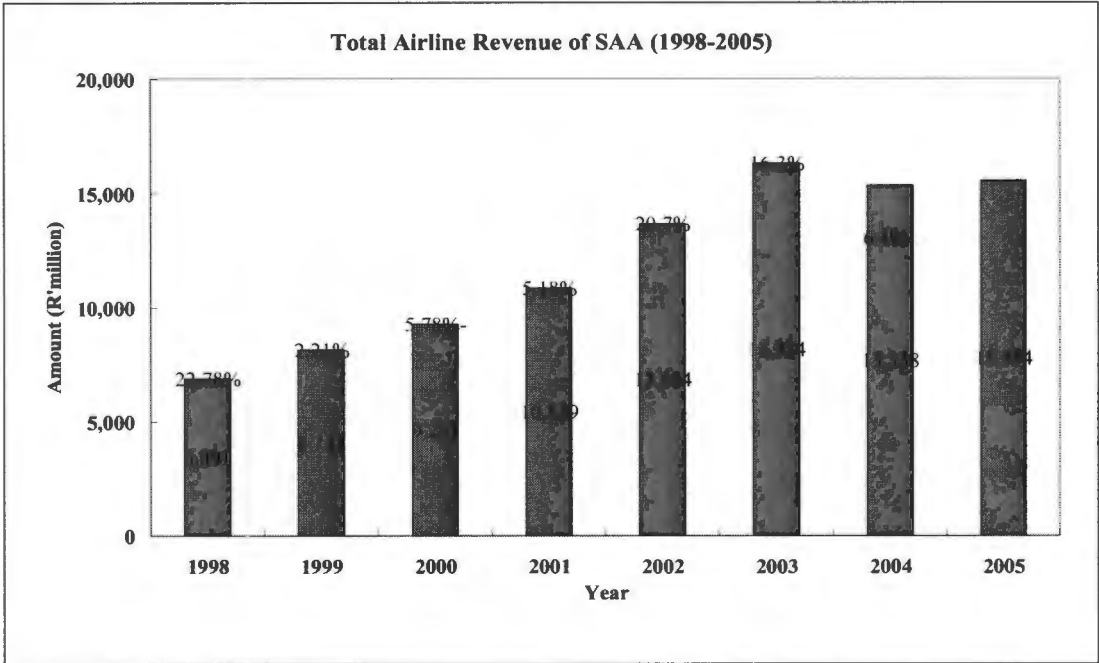
¹⁵ Entertainment cost was calculated at an average of R70 million per year, mainly for purchasing the copyright to the entertainment programmes onboard the aircrafts (SAA Annual Financial Report: 2002-2005).

¹⁶ SAA earns part of its revenue in foreign currency, which the part is affected negatively by the weakening of the Rand.

¹⁷ SAA incurred losses on hedging forward purchases of plans because the Rand appreciated against Dollar.

which recovers within the next two financial years.

Figure 1 Total Revenue Generated by SAA (1998-2005)



*Total airline income increases significantly by 20.78% from 2001 to 2002, and decreases by 6.4% in 2004.

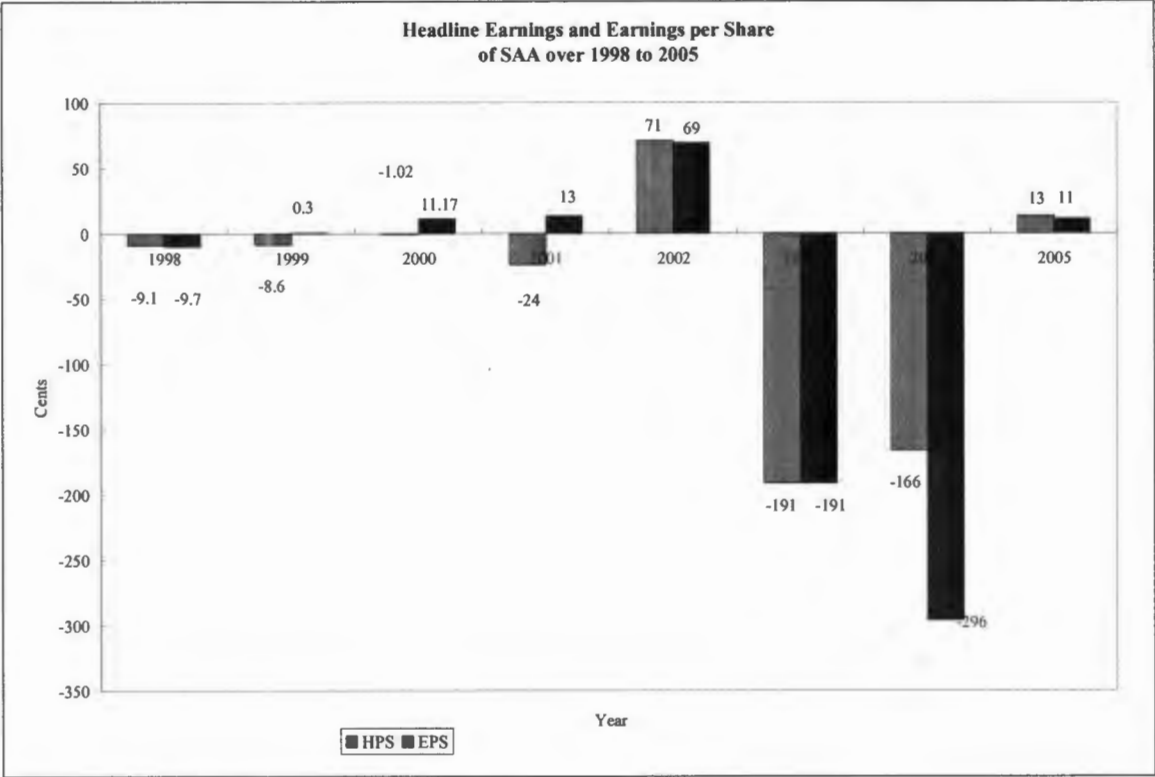
*Source: SAA Annual Financial Reports from 1998 to 2005

The improvement in the performance of SAA is also reflected by the significant change in the headline earning per share value from a loss of 166 cents in 2004 to a profit of 13 cents per share in 2005. Figure 2 below presents the movement of HPS and EPS of SAA from 1998 to 2005. The huge loss in 2004 is caused by a combination of extensive hedge losses incurred in the SAA hedge book, translations losses, provision in the commodity and currency price exposures, and first-time application of the new accounting policy¹⁸. The combination of these factors has resulted in SAA reporting consolidated losses of R6.3 billion in 2004. However, the earnings show an increase to positive values in 2005 which shows an improvement in the performance and delivers

¹⁸ AC 133: Financial Instruments, Recognition and Measurement is first time adopted by SAA in 2004.

positive message to the shareholders.

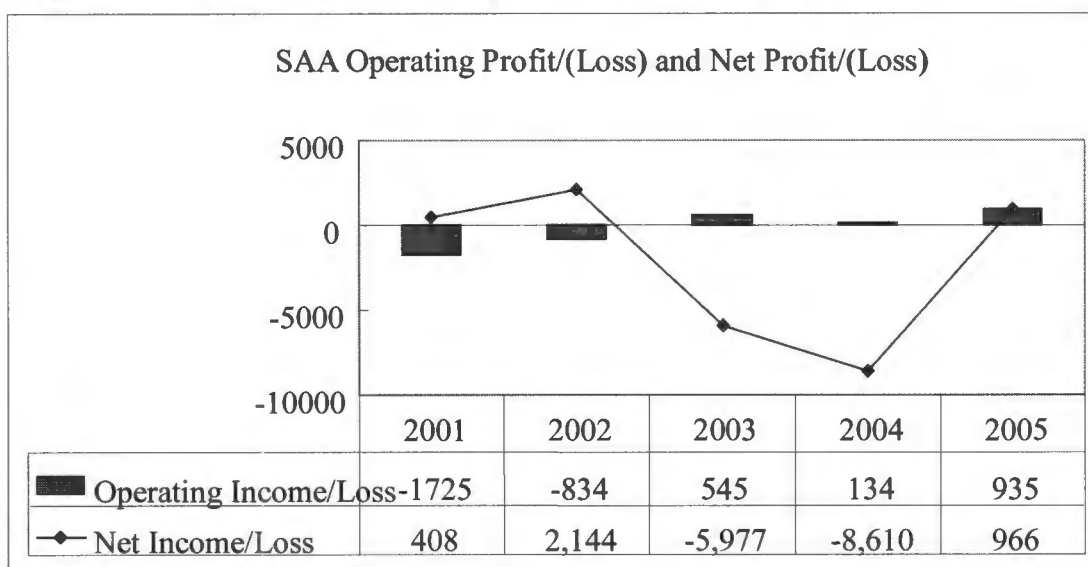
Figure 2 Headline Earnings and Earnings per Share of SAA (1998-2005)



*Source: SAA Annual Financial Reports from 1998 to 2005

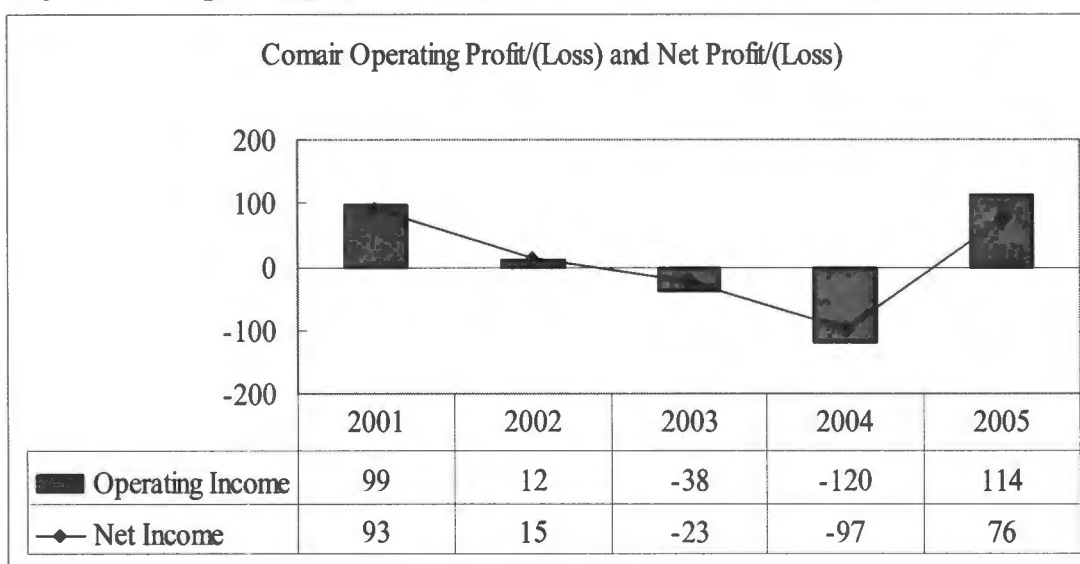
The losses of SAA lead Attributable heading income and revenue to massive decline over 2003 and 2004 for their shareholders. The impact of translation losses and derivative gains are graphed as Net Income in Figure 3 and Figure 4 below for SAA and Comair respectively to demonstrate the combined effect on the Operational Profit or Loss of the airlines.

Figure 3 Operating Profit/(loss) and Net Income of SAA (2001-2005)



*Source: SAA Annual Financial Reports from 2001 to 2005

Figure 4 Operating Profit/(loss) and Net Income of Comair (2001-2005)



*Source: Comair Annual Financial Reports from 2001 to 2005

However, the data in 2005 shows a change in profitability for SAA after so many years of losses. The financial reports indicate that SAA is starting to show an improvement in profitability for its shareholders, being the SA government, despite the challenges

facing the airline industry. To compare further of the financial measurement between a private and a state-owned airline, Return on Assets and Return on Equity are demonstrated in Table 3 below to show the airlines' performance.

Table 3 Return on Asset and Equity of SAA and Comair - 2001 to 2005

	2001	2002	2003	2004	2005
SAA					
ROE	5.95%	18.33%	-106.87%	-104.14%	13.40%
ROA	3.87%	13.57%	-38.79%	-51.37%	5.88%
Comair					
ROE	25.20%	3.91%	-6.53%	-41.45%	24.44%
ROA	11.97%	1.90%	-3.20%	-14.02%	9.42%

* Source: Annual Financial Reports of SAA and Comair from 2001 to 2005..

Comair shows aggregate higher returns over both Equity and Asset, except in 2002, which SAA performed rather, well due to several reasons mentioned above.

2.1.4 Critical issues

SAA has faced several critical issues such as financial risk factors and the threat of strategic movement by competitors from both the domestic and international markets. For instance, low-cost airlines, such as Kulula.com and 1Time have been very successful in capturing market share on domestic routes previously dominated by SAA. To compete against Kulua.com, the low fare airlines owned by Comair, SAA has also introduced its own low-cost airline, Mango, to compete with Kulula.com and 1Time. Despite the competition in the market, the most uncontrollable and critical financial risk

factors may be fluctuating exchange rates, interest rate volatility, and increasing fuel costs (Loudon, 2004).

Interest rate exposure has recently become a major expense item reported in SAA's financial statements, arising from the leasing costs of aircraft and network expansion (SAA Annual Financial Statement, 2001-2005).

The decision made by OPEC¹⁹ to increase fuel prices also presented a significant challenge to airlines, especially where it is the Board of Directors' policy not to hedge its jet fuel price risk exposure completely²⁰ (<http://www.opec.org/home/>). The unpredicted increase in fuel prices can result in further losses for airlines. At the same time, airlines cannot pass the full impact of the increased fuel prices onto their passengers, as this may cripple the global transport industry. Many global airlines have tried repeatedly to raise fares in response to high fuel prices, but with little success (Smyth and Pearce, 2006). This problem comes back to a lack of pricing power in a very competitive market. The fuel price will then continue to be one of the most important factors in future financial planning for the airlines.

Another current critical issue for SAA is the highly competitive environment in which it operates. This environment forces the airline to develop and implement its own unique

¹⁹ There was a phenomenal increase of 40% in fuel costs between 2004 and 2005, heavily impacting SAA's operational costs. Economists predict that the increase in the price of fuel will continue for the foreseeable future.

²⁰ SAA's risk policy permits the organisation to hedge its jet fuel price risk exposures using the following underlying instruments: IPE Brent Crude Oil, IPE GasOil 0.5%S, GasOil FOB ARAB Gulf 0.5%S and Jet Kerosene New FOB ARAB. It is SAA's policy to hedge jet fuel price risk exposures on a 12-month rolling basis.

strategies in order to adapt to changes in the environment and to satisfy passengers' needs, though the market contains similar difficulties for all airlines. Table 4 below presents information on the performance of the strategies employed by SAA's major international competitors (SAA Financial Result Presentation, 2005). Different situations faced by airlines are set under the column "Action", such as techniques to deal with low cost operators and creating new networks or partnerships. Solutions are set out under the "Competitor's Strategies" column with a further column setting out the Examples of International Airlines who are applying them accordingly. The actions taken by these competitors may create improved operations and improved levels of financial performance, which can serve as a good reference for SAA.

Table 4 Strategies employed by major international competitors of SAA

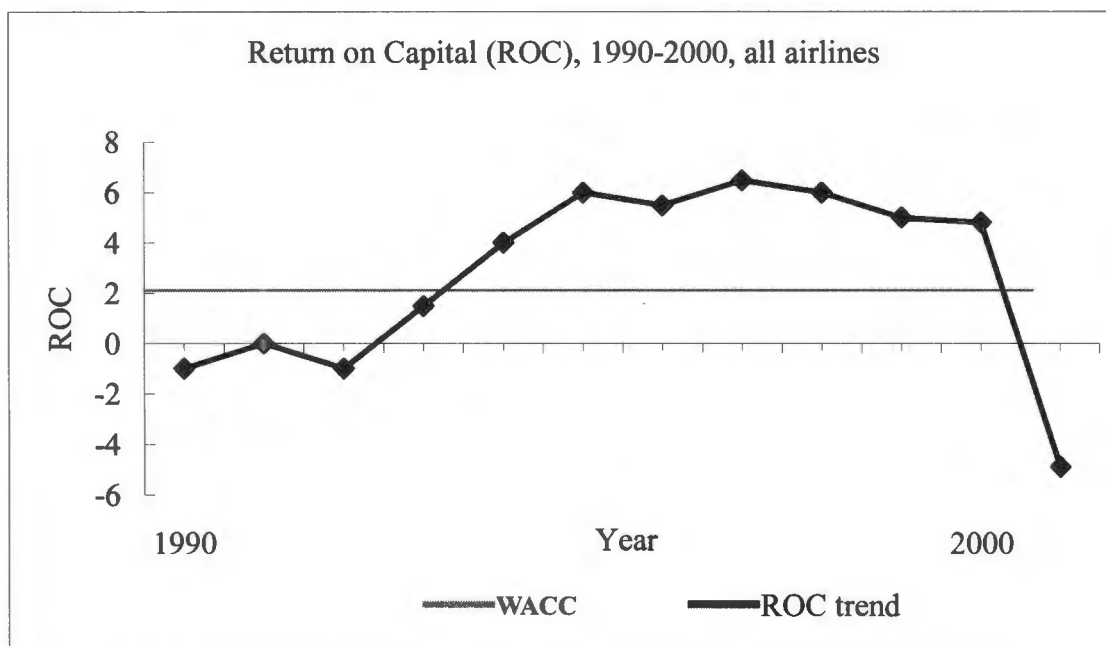
Action	Competitors' strategies	Example of Airlines
Low cost operator	<input type="checkbox"/> Creation of lower cost global networks	<input type="checkbox"/> Emirates, Qatar
	<input type="checkbox"/> Redefinition of main business models	<input type="checkbox"/> Aer Lingus, BMI
Network and fleet (r)evolution	<input type="checkbox"/> Increase network (re) segmentation	<input type="checkbox"/> Air France, SAS
	<input type="checkbox"/> Improvement and innovation in long-haul (e.g. fleet model A380, B777, A350)	<input type="checkbox"/> Virgin Atlantic, LH, Emirates, BA
Alliance and partnerships	<input type="checkbox"/> Selective cooperation	<input type="checkbox"/> LH/SIA
	<input type="checkbox"/> Co-existence of bilateral agreements with alliance membership	<input type="checkbox"/> LAN Chile
Simplification	<input type="checkbox"/> Growing cost-effective distribution channels/e-commerce	<input type="checkbox"/> Easyjet, BA
	<input type="checkbox"/> Easy check-in and boarding (e.g. e-ticketing and RFID)	<input type="checkbox"/> Delta Airlines, American Airlines, Cathay Pacific, Singapore Airlines

* Source: SAA Financial Result Presentation, 2005

In addition, as the bargaining power of passengers is becoming stronger than that of the carriers, competition has become more intense for SAA in the international market.

Thus, SAA may implement a series of improvements, such as a customer-focused approach, improved technology, building brand loyalty, and cultivating a reputation for safety, in order to pave the way for long-term profitability. However, in addition to this competition, there are other external challenges for the airline. SAA expresses concerns when facing the strengthening of Rand, global terrorism, and regulatory challenges in Africa Aviation. The key internal challenge which SAA faces is the inability of the return on the invested capital (ROC) to cover the weighted average capital cost (WACC). As the state-owned airline, SAA shows same result as other International Airlines from the study conducted by IATA (Smyth and Pearce, 2006)²¹.

Figure 5 Return on Capital of All Airlines – 1990 to 2000



*Data obtained from the SAA Annual Financial Report and Financial Review Presentation of 2005.

²¹ Airlines of this study delivered a median average annual return on invested capital (i.e. the return for the average firm) of 4.9% from 1996 to 2000. However, the weighted average annual ROC was calculated at 3.8%. The study shows that not one of the airlines was found to earn a return above its cost of capital.

Figure 5 above shows a draft movement of Return on Capital from 1990 to 2005 presented by SAA and Comair in comparison to the IATA study in Appendix 2. SAA however, has identified key financial objectives which management will utilise continuously before the next financial milestone in order to improve the capital structure with turnaround strategies.

2.1.5 Current structure

After entering alliances with certain strategic partners, SAA has evolved from a low-frequency international airline (two or three flights per week to many destinations) to one that provides a leading and regular service through the routes offered by its partners. Existing partnerships increase the effectiveness of marketing and sales by enabling SAA to reach more than 700 destinations throughout the world, especially American, Asian, Australian, and African destinations (SAA Annual Financial Report, 2005).

Its application to join the Star Alliance in 2004 enabled SAA to offer passengers access to 700 airports in 128 countries, entry to over 550 priority reservation lounges, standby, and boarding, priority baggage handling, and flexible round-the-world fares (SAA Annual Financial Report, 2005). The multi-faceted benefits of this alliance are expected to generate substantial additional foreign income for SAA. This reduces the exposure of SAA to a depreciating Rand, as an increased portion of revenue will be denominated in foreign currency.

In order to improve the company's overall performance, a reconstruction programme has been implemented to prepare SAA to operate independently from Transnet (SAA Annual Financial Report, 2005). SAA will be spun off to the South African government (Department of Public Enterprises) within the next few years. The attainment of the company's strategic objectives, including sustaining operational profitability and increasing productivity and efficiency, continues to be the core focus of SAA's management. Therefore, SAA views the forthcoming financial year as one of further consolidation (SAA Annual Financial Report, 2006).

2.2 Comair

Comair Limited trades under the brand British Airways (BA) and Kulula.com and provides domestic and regional air services in Southern Africa. Kulula.com is based on a strong Internet-powered reservation system.

2.2.1 History

In the 1940s, Commercial Air Services (Pty) Ltd (CAS) was formed to deliver general commercial aviation goods and services to the public. At an early stage for CAS, two distinctive divisions were formed: the airline division and the general aviation division. In 1967, the airline division was incorporated individually into a company known as Comair and at the same time it was first listed on JSE, whereas the general aviation

division transformed into the management of the franchise of Cessna aircrafts in South Africa (www.comair.co.za).

In 1995, CAS was deregistered and the equity in Comair was held directly by management and other investing shareholders. In 1998, Comair converted into a public company and was listed on the JSE as Comair Limited (www.jse.co.za and www.comair.co.za)

In recent years, in order to gain community participation and to create market awareness, Comair has integrated an ethical framework through several South African Social Performance programmes, such as by providing free transport to CIDA City Campus and South African Police Services (SAPS) members. Financial sponsorship includes providing financial support to Africa Book Connection (ABC) and The De Wild Cheetah Centre, as well as participation in a government project involving the South Africa Eastern Province Development Project. A Public Image Creation via Cow Parade Campaign has been implemented successfully throughout the country. Comair has also been involved in environmental protection projects such as Project Starfish/Reach for a Dream and charity programmes such as Helping the Children via Kulula.com. These marketing strategies have helped Comair establish a rapid but successful brand awareness within a short period, indirectly consolidating its domestic position in the market (Comair Annual Financial Statements: 2000-2005).

2.2.2 Principal accounting policy

Financial risks are managed by using the following methods: interest rate risk is managed by fixing the rate on long-term loans (borrowing fund) and investing surplus funds (placement fund) with yields at market returns. The company hedges the foreign currency risk factor by entering into forward exchange contracts, but does not employ other derivative instruments. As SAA does not speculate on future currency movements, therefore takes only forward cover on foreign currency exposures. The financial statements report that the hedging of foreign currency risk has generally resulted in gains for the company²².

2.2.3 Financial highlights for Comair

Competition in the domestic air travel market has become increasingly aggressive, and air travel is more affordable than ever. During the study period, Comair experienced a decline in domestic yields and an unprecedented market volume growth, with high peak performance of approximately 14%, and the turnover increased by 16% in 2005, as a result of the company gaining market share.

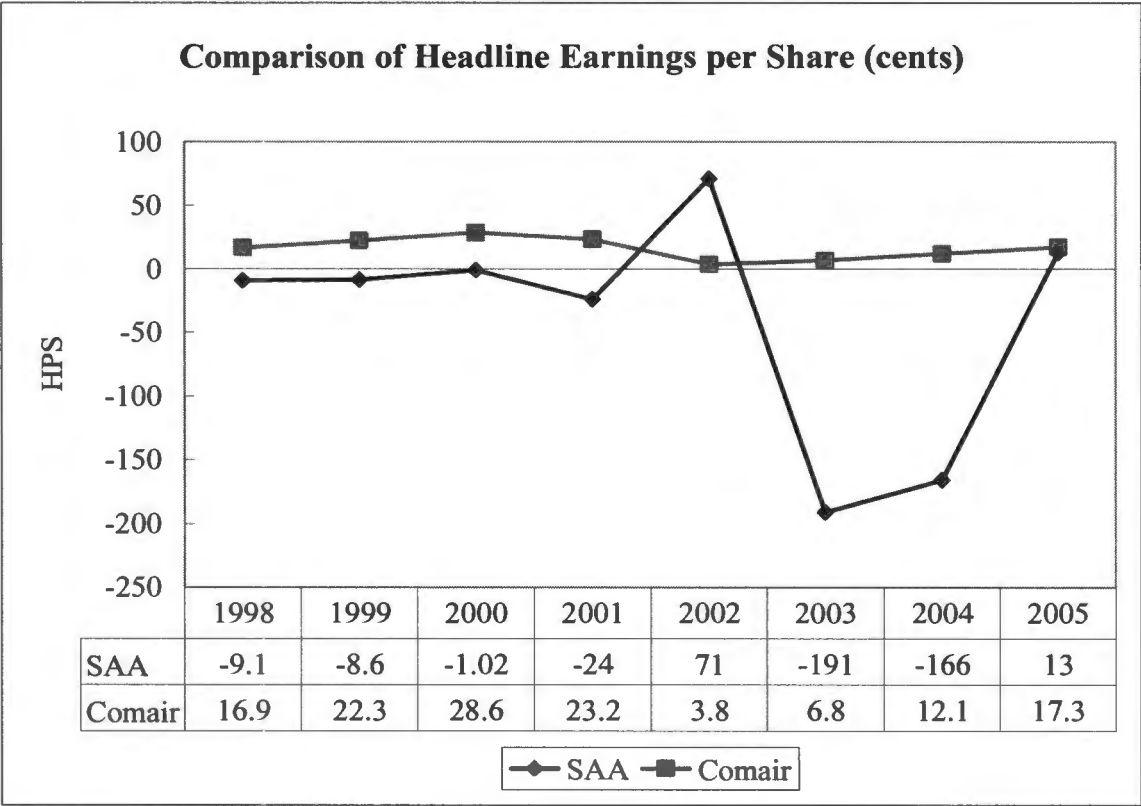
According to the revenue recognition policy of Comair, revenue is recognised from all

²² Approximately 40% of operating costs and 12% of revenue were calculated in foreign currency in 2005. Two forward exchange contracts were signed to commit to the purchase of two Boeing aircraft at US\$14.4 million at an average forward rate of R6.09/US\$. The fair value at year-end reflected a favourable amount of R9.3 million to the company.

airline-related transactions, arising mainly from the provision of transportation services to passengers.

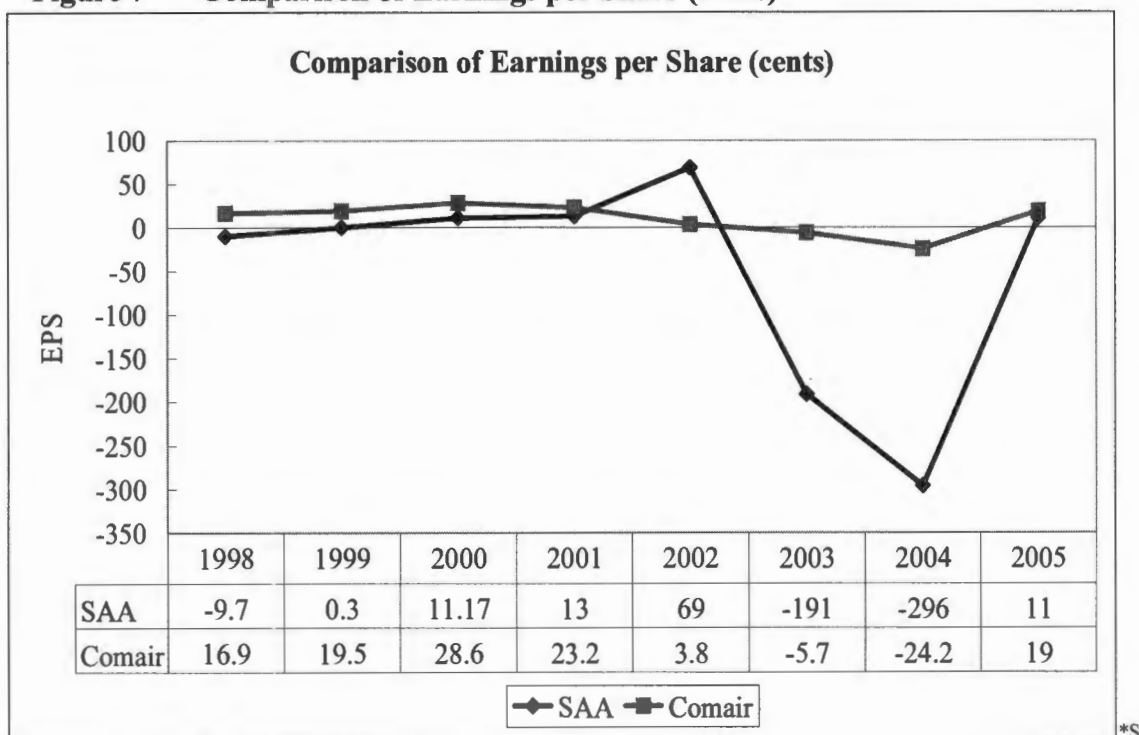
Figure 6 and 7 below of Airlines' HPS and EPS, show that shareholders investing in Comair gained better returns in comparison with SAA, except in 2002 when SAA generated the highest net profit of R 2.144 billion, which gives a final headline earnings per share of 71.0 cents per share and 69 cents of earnings per share. In general, HPS and EPS show that Comair pays out more consistently with less fluctuation during the period of study.

Figure 6 Comparison of Headline Earnings per Share (cents)



*Source: Annual Financial Reports of SAA and Comair from 1998 to 2005.

Figure 7 Comparison of Earnings per Share (cents)



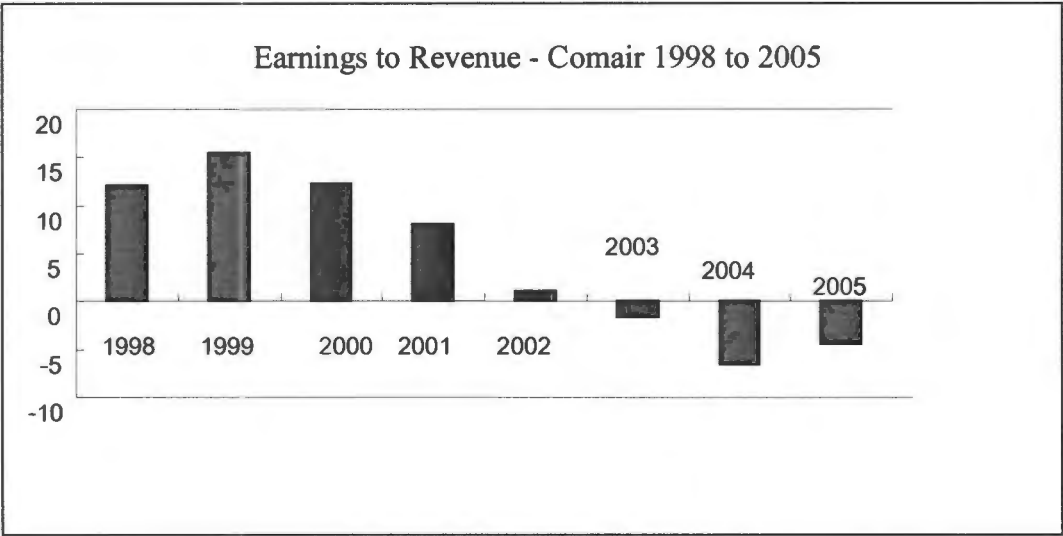
*Source: Annual Financial Reports of SAA and Comair from 1998 to 2005.

The influence from the fuel price changes and exchange rate risk factors also affects the operational costs of Comair, particularly in 2005, when the operational cost was affected by a 32% average increase in the dollar price of Brent crude oil, which has had a significant impact on jet fuel prices (Comair Annual Financial Report, 2005). The strong Rand also mitigated the high dollar cost of fuel and reduced the company's exposure to other dollar-based costs.

The impact of the combined effect of the exchange rate and cost of fuel led to a serious loss for Comair in 2002 (Comair Annual Financial Report, 2002). Later Figure 8 and 9 demonstrate Revenue and Attributable Earnings made by Comair from 1997 to 2002. The highlight on the tremendous decrease of headline earnings per share focuses on the

unprecedented challenges for the global airline industry exacerbated by conditions in Southern Africa and the economy linked to the collapse of the Rand and general market capacity. In general, Comair shows that the company increased its market share as the revenue grew constantly during our period of study despite the possible threats in the global aviation industry (Comair Annual Financial Reports, 1998 - 2002).

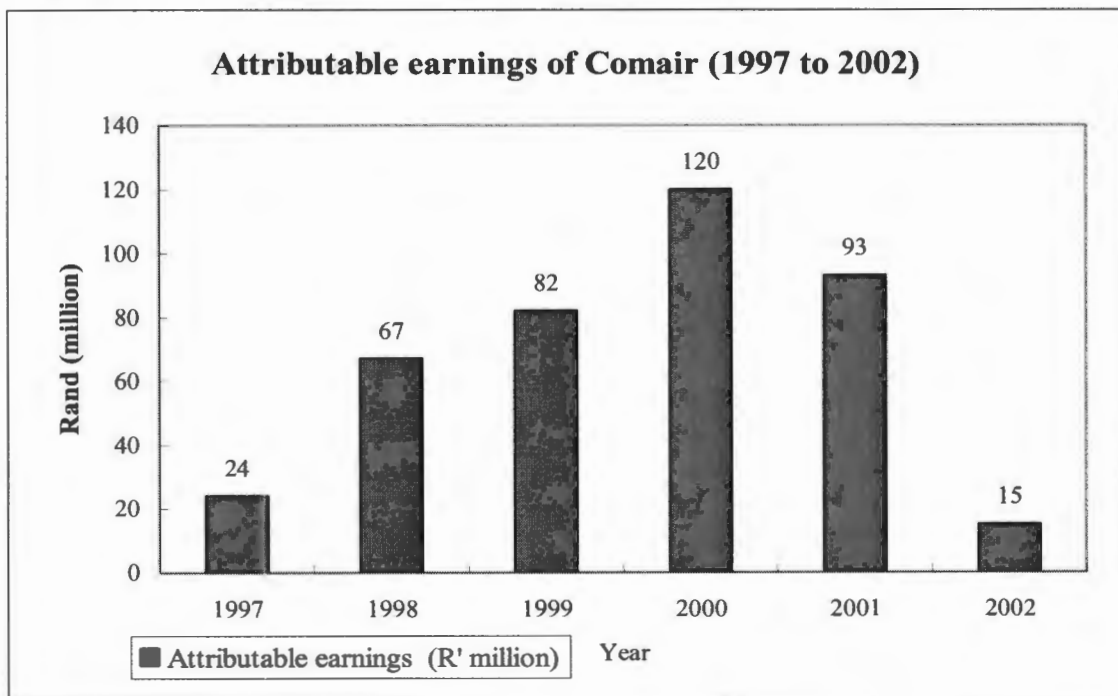
Figure 8 Earning to Revenue Comair 1998-2005



*Source: Comair Annual Financial Reports from 1998 to 2005

However, Figure 8 above also shows that the operating margin of 2002 was eroded due to the negative cost impact of the weaker Rand on fuel, maintenance, insurance, and distribution costs. With half of Comair’s operating costs linked directly to the U.S dollar, the 34% weakening of the Rand increased unit costs by 17% for the year (Comair Annual Financial Report, 2002).

Figure 9 **Attributable earnings made of Comair from 1997 to 2002**



*Source: Comair Annual Financial Reports from 1997 to 2002

A constant increase in turnover revenue and passenger growth is a positive sign for Comair. In particular, yield growth during our study period helps to restore the low break-even load factors and fixed costs in operation. However, proper strategies for hedging against an increase in fuel prices and financial risk management is increasingly crucial for management.

2.2.4 Challenges facing Comair

Unlike state-owned SAA, Comair, as a private airline operator, has struggled for a considerable time due to economic challenges and competition. Comair has shown superior management, as the company enables shareholders to gain minor returns on their investments, even during times when macro-economic factors have had a huge

impact in general. Comair has managed to achieve a continuously growing market share under the brands of British Airways and Kulula.com, in spite of strong competition and a legal case involving SAA (SAA Annual Financial Report, 2006) at the Competition Commission²³ regarding abuse of dominance in terms of the Competition Act²⁴ (Competition Commission: Press Statement-5 June 2007). This indicates that there will be more challenges in the future, as the combination of market tendency and financial risk factors will be more complex.

2.2.5 Current structure

Due to economic restructuring, the imperative to re-address the historical inequalities of the past and to increase the presence and ownership of previously historical disadvantaged South Africans, Comair has been active in the development and implementation of the BEE (Black Economic Empowerment) charter for Transport (Comair Annual Financial Report, 2003). This participation has affected the company's employment equity, training, management, social responsibility, and procurement practices. It is also unavoidable for Comair to consider the opportunities for Previously

²³ The Competition Commission was formed by the New South Africa Government, and aims to exercise the fundamental principle of competitive policy and law in SA to balance economic efficiency, socio-economic equity, and development. One of the objectives of the Competition Commission is to provide consumers with competitive products and services (www.compcom.co.za).

²⁴ In 2007, a penalty of R55 million was paid to the Competition Commission by SAA as the airline had abused its dominance in contravention of the Competition Act with the following three matters. Firstly, SAA and Lufthansa are alleged to have been involved in price-fixing as a consequence of various bilateral agreements between the two airlines. SAA agreed to pay a fine of R20 million. Secondly, a complaint was formed based on an alleged fixing of fuel levy charges through an agreement by domestic airlines, resulting in an agreed penalty of R20 million payable by SAA and SA Express jointly. Lastly, SAA was fined for the abuse of dominance complaints by Comair regarding override commission and trust payment agreements between SAA and travel agents by coercing them not to deal with its competitors and the resulting fine was R15 million (www.compcom.co.za and SAA Annual Financial Report: 2006).

Disadvantaged Individual shareholdings in the company (Comair Annual Financial Report, 2005).

2.3 Common risks faced by the airline industry

Like other airlines, SAA and Comair are exposed to significant risks which can affect the attainment of the companies' objectives and impact their financial performance. The risks can be seen as challenges from the external environment and these factors include, inter alia:

- Exchange rate fluctuations;
- Rising commodity prices and volatility in jet fuel prices;
- Fluctuating interest rates;
- The effect of pandemics;
- Extraordinary events such as terrorist attacks;
- Over-capacity in the market;
- Robust competition on fares;
- Strong government influence;
- Highly cyclical environment, easily influenced by extraordinary events;
- Operational and financial gearing;
- Low entry barrier to get into the market but high exit barrier; and
- Need for continuous capital investment²⁵.

* Source: 2005 SAA Annual Financial Presentation, and Comair Annual Financial Report.

²⁵ SAA required an ongoing capital investment in planes as SAA's ability to invest is limited due to the company's financial leverage level. For example, there is a compulsory convertible subordinated loan from Transnet which makes it difficult for SAA to retain income every year, as most of the cash generated is used to pay back the loans.

Effectively dealing with these challenges is critical to the improvement of the airlines' operations and shareholder returns. Although certain issues are not derived directly from financial perspectives, the value behind them can alter the financial performance in either the long- or short-term to a certain degree, such as obtaining the landing permits or new regulations from the governments. Thus, it is essential for us to understand those risk factors and consider their impact equally when we analyse and compare the two airlines.

2.4 Extraordinary aviation events

A downturn in SAA's financial performance commenced before September 11, 2001, and the terrorist attacks on New York's commercial centre significantly accelerated and further worsened the decline in the industry. Insurance costs increased by R200 million per annum as a result of this extraordinary event. However, Comair's market share remained steady, unlike those of other international airlines, after the incident on September 11, but the impact on the industry resulted in negative growth for the financial year in 2001.

The subsequent war in Iraq, the outbreak of Severe Acute Respiratory Syndrome (SARS) during the first quarter of 2003, and the worsening international economic climate have further increased the challenges facing the industry. These circumstances have resulted in many of the major carriers worldwide posting significant operating losses for the first and second quarters of 2003 despite the support provided by certain

governments to the aviation industry in their countries. SAA did not receive any extra support from the government, nor did Comair receive any government support. It might be difficult to look at the impact on SAA since it is a state-owned airline, but the investors' response to the aviation industry and Comair was one of reduced expectations, and was promptly reflected in the share price, which fell during the period.

In the operational and economical environment, it is easy to observe numerous similarities between SAA and Comair. This research is aimed at evaluating the risk factors and analysing their impact by comparing the significance of the test results with our reference study. Comair may show sound performance, but the government support of SAA is not negligible.

IATA, which conducted research (Smyth and Pearson, 2006) on international airline returns, indicates that the airlines in the study were unable to pay satisfactory returns to their own investors. Recommendations were made to improve international airline performance. Firstly, the industry should exclude heavy-handed government intervention, which damages airline profitability²⁶. Secondly, inefficiencies and monopolistic power within the supply chain must be identified and addressed²⁷. Lastly, the airline industry itself must continue to seek its own efficiency gains, value creation, and productivity. This is achievable by constructing strategic movements in order to

²⁶ Government regulations and financial requirements, e.g. tax and land permit, decrease shareholders' returns on investment.

²⁷ Computer reservation system providers, manufacturers and major airports have exploited their monopoly position or impose charges that are wholly unjustified by their level of efficiency or by the risks they bear.

satisfy investors, customers, and the wider economy.

The next chapter includes a literature review in order to provide a better understanding of the latest research on the financial risk exposures faced by the airline sector.

Chapter 3. Literature Review

Chapter 3. Literature Review

The aviation industry, especially airline operations, used to be a profit-driven sector. However, one of the publications from IATA by Smyth and Pearce (IATA economic briefings No. 4: 2006) states that Computer Reservation System (CRS) sector currently delivers largest average annual surplus of USD 660 million in the aviation industry, from the period of 1996 to 2004. Revenue declined in airlines operation is due to increased competition, deregulation, and risk factors which started to have a negative impact. For effective management of the risk exposures, Meulbroeck (2002) suggested that airline companies implement corporate risk management by modifying their operations, adjusting their capital structure and using targeted financial instruments such as derivatives or hedging. The airline sector is one in which corporate hedging is likely to add value by minimising the under-investment problems (Carter, Rogers, and Simkins, 2002). In the study of corporate risk management, hedging adds value by reducing company taxes, minimising costs associated with reorganizing financially troubled companies, and preserving (or strengthening) management's incentives to invest in the company's future (Carter, Rogers, and Simkins, 2006). Later, this study will investigate the mechanism used by SAA for the mark-to-market hedging to maximise the company's revenue and shareholders' interest.

The literature review of this study includes three main sections. The first section details the theories on exposures and how these factors influence the company hedging policies. The second section discusses the major risk exposure factors: interest rate risk, currency risk, and fuel costs. The theories of how these risk exposures influence the

value and returns of the airlines are also summarised. The third section examines the results of research studies on the effects of using hedging instruments, which are utilised by most international airlines. We also include dividends as a variable in the value calculation process, which may affect the hedging decisions and have a certain impact on the value of the company.

3.1 Theoretical perspectives

The first stream of theoretical models includes those used to examine how the fundamental competitive structure of the industry affects the determinants of the risk exposures and vice versa. A firm is subject to “economic exposure” if the firm’s value, as measured by the present value of its expected future cash flows, is sensitive to the expected changes in either of the exposures²⁸.

A number of studies have investigated various determinants of exposure and the hedging policies to mitigate it (Adler and Dumas, 1984; Levi, 1994). The importance of supply and demand conditions in determining economic exposure has been emphasised, including the profitability of sales in the foreign country. Nevertheless, none of these studies has focused on a simple fact: in many forms of competition, and even in the case of a monopoly, the economic exposure of an exporting firm is proportional to the firm’s net revenues based in foreign currency. Therefore, the firm does not need to know about the price elasticity of its product demand or its marginal costs. Thus, no revenue-based hypothesis has proven the influence of company structure on the

²⁸ Although all economic exposure measures the effects of unexpected changes in exchange rates on cash flows, all changes in the exchange rates were treated as unexpected in these studies.

financial risk exposures, based on the results of these studies.

Other studies (Marston, 2001; Allayannis and Ihrig, 2001) have pointed out how the economic structure in general helps to determine the exposure effects of exchange rates on firms. This research emphasizes the prime importance of the competitive structure within the industry. Different forms of competitive structure have been used to examine how exchange rates affect the cash flows. The format includes a simple monopoly and duopoly (consisting of a dollar-based exporter and a local firm in the foreign/export market). Results show that, despite the format of the company, the firm is exposed to exchange exposures as long as the demand for its product is substitutable²⁹ with that of the other firm, regardless of the forms of competition existing between the two companies.

Several studies have demonstrated that net foreign revenues are the main components of a firm's exchange rate exposure. Marston (2001) has argued that, for an oligopolistic firm, exposure is a function of the firm's own elasticity of demand and the cross-elasticity of demand with its competitors. Bodnar, Dumas, and Marston (2002) showed that pass-through³⁰ can impact exchange rate exposure because firms with inelastic demand can pass price changes on to consumers. The study also found mixed empirical support for a relationship between exchange rate exposure and its theoretical determinants, and found that exposure is of negligible economic importance. However, further studies (Doidge, Griffin, and Williamson, 2002) have shown that a firm's

²⁹ Two goods are strategically substitutes if a rise in one firm's output lowers the marginal profit of the other firm (Bulow, Geanakoplos, and Klemperer (1985)).

³⁰ Mark-up refers to the price over the cost margin, while pass-through refers to a firm adjusting its foreign currency price levels to offset the impact of exchange rate changes.

foreign activity is broadly and significantly related to exchange rate exposure and that, after controlling for this activity, large firms are more sensitive to currency movements than small firms (firm size as controlling variable). Exchange rate movements have an economically significant impact on firm value, based on the movement in average share returns, in ways that are consistent with theoretical studies.

While this study demonstrates that exposure can be non-linear, offset within a firm, and complex, the theory has pointed to an economically important relationship between exchange rates and firm value.

Another line of research includes the analysis of stock returns and empirical measures of individual risk exposures such as exchange rates (Jorion, 1990), interest rates (Sweeney and Warga, 1986), and gold prices (Tufano, 1998). A brief outline of each exposure will be discussed in the next section.

3.2 Analysis of risk exposures

This second section of the literature review includes those analysing share returns by measuring the empirical findings of corporate exposure to risks such as exchange rates, interest rates, commodity prices,³¹ and unlikely events. Exposure to these major financial risk factors is expected to impact the returns of the airline industry. Studies of risks such as exchange rate exposures (Jorion, 1990), interest rate risk (Sweeney and Warga, 1986) and commodity price risk (Tufano, 1998) indicate that the companies

³¹ The focus is mainly on fuel prices, as this is the most relevant commodity for the airline industry.

studied are sensitive to these risk exposures to certain degrees. The airline industry is specifically characterised by distinctive features such as: seasonal demand, strong price competition on both domestic and international routes, high capital investment and gearing levels, extraordinary events, estimation of price increases in commodities, high fixed costs of labour and equipment, and various regulatory impediments.³² Due to the existence of these features, airlines may find it rather complex and intricate to effectively reduce the impact of the exposures by restructuring their operations to internally hedge or initiate other offsetting instruments. Therefore, most of the time, should something happen, the impact would be extremely serious on the financial performance of the airline companies when compared to the effect on other industries.

The next part of this section includes an analysis of other studies discussing the potential consequences of interest rate, currency, and fuel price risks on airline stock returns.

3.2.1 Interest rate exposure

The interest rate is an important factor in the airline industry, as loans, operating leases, and financial leases are extensively used to finance the acquisition of airplanes. High financial leverage ratios³³ are observed in the financial reports of airline companies. The sector is relatively capital intensive due to the nature of the assets. Equity investment can be difficult to source because of the high earnings volatility. Lower than

³² Includes ownership control, landing rights, and commercial permits to load/offload passengers and goods.

³³ This is particularly true if the present value of all long-term operating lease commitments is included as debt in determining airline debt-equity ratios.

average price-earning ratios, which are typically found in the airline sector, also reduce the scope for equity financing.

Borrowing costs are directly related to interest rate changes. This is applicable if companies have variable rate leases and loans. Operationally and financially, there are also significant indirect costs associated with higher yields. The interest rate has a significant influence on the general economic conditions and progression of the business cycle (Bartram, 2002) in the company, with a consequential effect on consumer demand. This is especially applicable for industries such as aviation, where demand is cyclical and seasonal.

Interest rate exposure is also related to the effect of financial distress on the airline industry. Financial distress derives from the following: the forced sale of assets such as the aircraft fleet at heavily discounted prices (Pulvino, 1998, 1999) because distressed airlines are forced to sell aircraft at below market prices, the purchase of new aircraft due to competition or contractual obligations, above industry average debt levels, and a decrease in revenue due to competition. Studies show that expected distress costs are related to the interest rate exposures (Carter, Rogers, and Simkins, 2002). Higher interest rates may increase expected costs of distress, and this is particularly true for the airline industry, where operating and financial leverage is high and distress costs are substantial. Froot et al. (1993) have suggested that firms facing significant expected distress costs tend to under-invest. In essence, the under-investment cost is an indirect cost of financial distress, and decreases firm value.

Since the studies show that both the direct and indirect costs of borrowing move in the

same direction as interest rates, the returns should be negatively correlated to interest rates. It is, therefore, expected that, in a later section of the study, interest rate exposure coefficients will be negative in relation to share returns.

3.2.2 Currency Exposure

Foreign exchange currency exposure has been defined as the sensitivity of the market value of the firm to unanticipated exchange rate movements (Dumas, 1978, Adler and Dumas, 1980, 1983). Therefore, exchange rate effects are dependent upon the firm's foreign exposure (determined by its operating revenue, cost exposure, and operating cash flow margin) as well as the use of foreign currency hedging instruments.

Currency fluctuations and risk exposure to the currency factor are important management tasks for airline companies. Studies have confirmed the influence of currency risk on airlines for a number of reasons. Firstly, most of the expenses and revenues are deployed in several of the local and major currencies³⁴, so the fluctuation of either currency affects the profitability of airlines in varying degrees. Secondly, borrowing costs may also be stated in different currencies, so the liabilities of the airline may change along with the equity. Thirdly, exchange rate levels and local competition influence the exchange rate risk factor and income generation simultaneously, mainly due to the influence of tourism demand from overseas. This forces the airline company to adjust its overseas revenue accordingly.

³⁴ In the Group Financial Statement of 2005, SAA reported its operations in South African Rand; however, the operating costs increased 1.9% to R16 507 million as the result of the significant influence of fuel price and foreign exchange rate fluctuations.

Several researchers have analysed the theoretical determinants of exchange rate exposures under a variety of industry structures. These studies (Shapiro, 1975; Marston, 2001; Williamson, 2001; Allyannis and Ihrig, 2001, Bodnar, Dumas, and Marston, 2002) show that exposure is related to several variables as discussed below.

Firstly, much of the revenue generated by the airline companies is subject to exchange rate exposure. Sales of tickets include both domestic and international passengers, with a mix of local and major currencies. Foreign operations include the settlement of the expenses and receipt of revenue in foreign currency, which may have to be converted into a third major currency, resulting in an additional level of exchange uncertainty. For example, SAA's operations in Rwanda, which are stated in Rwandan francs, must be converted into US dollars and then into South African Rand in the financial report³⁵.

Secondly, the intensity of competition plays a crucial role, especially for the international routes, where price needs to be adjusted in line with the local airlines. As revenues are strongly influenced by exposure to movements in the exchange rate, price levels can offset the impact of exchange rate changes. Exposure levels can be influenced by industry-related factors such as mark-up and pass-through figures. Allayannis and Ihrig (2001) have shown that exchange rate exposure has larger valuation effects during periods of higher competition and lower mark-ups, and is lower for more highly concentrated industries since mark-ups are higher. Thus, the

³⁵ Overseas sales ticket prices may be stated in US Dollars and converted daily into local currency, thus the customers are subject to part of the exchange rate risk. However, the local operating expenses are payable in local currency, which is difficult to adjust according to the daily exchange rate, and airlines need to absorb potential exchange rate losses.

industry-related factors strongly influence the exposure levels, and vice versa, from the competitive perspective.

Thirdly, domestic and foreign inputs to production are substitutable in such a way that the market share is related to fluctuating exchange rates. A study by Bodnar, Dumas and Marston, (2002)³⁶ indicates that, for any given market share, higher substitutability of the degree of the operational input to production decreases pass-through rates and increases exposures. The result of an increase in exposure is a decrease in market share, to some extent.

Fourthly, the currency exposure movement has an ambiguous effect on revenues. Appreciation (depreciation) of the domestic currency reduces (increases) the borrowing cost of foreign-denominated debt and other foreign-sourced costs. Loudon (2004) has suggested that there is a positive correlation between the fluctuation of the local currency and the foreign-based costs. Foreign demand for international and domestic flights moves inversely with the value of the home currency. For example, if the Rand depreciates, demand for flights to and within South Africa from non-residents will rise. While domestic travel demand from residents also moves inversely with the home currency, demand for international travel changes directly. As the currency depreciates, residents are likely to select domestic travel ahead of international destinations. Competition in the airline industry is expected to prevent airlines from fully protecting their revenues from the impact of these currency movements.

Fifthly, the degree of currency exposure is related to the multinational status, foreign

³⁶ Empirical support for the predictions of this model is limited, partly as a reflection of the difficulty of operationalising the theoretical variables.

sales, international assets, and degree of industry-level competitiveness of the airline. The significance of the exposure as measured by share returns, is dependent on the specific exchange rate, and varies over time (Dominguez & Tesar, 2004, Doukas, Hall & Lang, 2003). Airlines with foreign routes or various country offices are likely to have additional foreign sales, and airlines with holdings of international assets are more likely to be exposed to exchange rate movements. With all of these effects offsetting and counteracting each other, the final impact of the currency exposure is uncertain.

3.2.3 Fuel price exposure

Fuel price management is crucial since jet fuel costs comprise a significant component of airline operating costs. Statistics show that jet fuel costs constitute approximately 13 per cent, on average, of an airline's operating costs. Thus, jet fuel price risk is economically meaningful to airlines³⁷. Carter, Rogers, and Simkins (2002) have argued that airlines also face an under-investment problem when profitable investment opportunities arise during times of high jet fuel costs. In general, there is a positive correlation between industry investment opportunities and jet fuel costs in the airline industry, while higher fuel costs are consistent with lower cash flow. Given that jet fuel costs are hedgeable, airlines with a desire for expansion may find value in hedging future purchases of fuel (Carter, Rogers, & Simkins, 2002). Research shows the return on assets (ROA) can be used to measure profitability. Allayannis and Weston (2001) have found a positive correlation between ROA and firm value. As the principal benefit

³⁷ Jet fuel costs are not adjusted for inflation in the analysis presented in this section. Adjusting jet fuel costs for inflation does not affect the general conclusions reached in this study. Further, the impact of the inflation on the jet fuel costs may be offset by fuel-saving measures used by airlines, such as using more fuel-efficient aircraft.

of fuel hedging by airlines comes from a reduction of under-investment costs, the empirical evidence shows a positive relation between hedging and value increases in capital investment.

Loudon (2004) suggested that short-term cash flows are likely to be directly related to changes in fuel prices due to price change inertia. Revenue responsiveness may initially be slow due to advance sales, pre-committed advertised package fares, pre-booked seats, and so on. From the intermediate-term perspective, the impact of fuel price exposure is likely to be more firm specific and to reflect varying degrees of competitive power and/or fuel efficiency across different airlines. In the longer term, much of the price effects are likely to be passed on, as all airlines face similar fuel costs. Carter, Rogers, and Simkins (2002) provided evidence that airline cash flows and share returns are negatively correlated with fuel price changes. Airline profitability is reduced by the direct and indirect costs associated with fuel prices. Since competition prevents an airline from perfectly undoing the impact of changes in fuel prices by adjusting its fare schedule or seat capacity according to the optimal mark-up, the fuel price exposure coefficient, discussed later in the current study, is predicted to be negative.

3.3 Hedging in the airline industry

This third section of literature review includes studies analysing the correlations between risk factors, corporate values, investment decisions, and the hedging effects of the company. The review focuses especially on studies of airline companies which focus on corporate values and the utilization of hedging instruments to minimize the

under-investment problems.

Airline companies mainly use hedging instruments for managing fuel cost exposure. Studies show that airlines increase value by hedging their jet fuel price exposures (Allayannis and Weston, 2001; Carter, Rogers, and Simkins, 2002). Guay and Kothari (2003) suggested that, in prior studies, most sampled firms who hedged by using interest rate and/or currency derivatives may have been unable to gain significant benefits from their derivative holdings. Therefore, hedging jet fuel prices is more effective since fuel prices are more volatile than prices of other underlying assets, particularly currencies³⁸. Carter, Rogers, and Simkins (2002) have shown that the annual fuel price volatility amounts to a monthly average between 1994 and 2000 of approximately 26 per cent. As a point of comparison, Guay and Kothari (2003) found the annualised volatility of the major currencies to be only 11 per cent. The cash flow of an airline is also sensitive to extreme jet fuel price changes when compared to changes in capital expenditures. Overall, airline exposure to fuel prices is economically significant, and considerable cost savings would be realised by airlines hedging in the event of an extreme price increase.

From an investment perspective, hedging allows airline companies to fund investment when jet fuel prices are high and airline operating cash flows and values are down. There is a positive relationship between hedging and value, suggesting that investors view such investment as positive net present value projects. Airlines have incentives to hedge fuel exposures to protect their internal cash flow in order to meet future

³⁸ This may not be the case with SAA in our study because the South African currency is one of the firm's exposures, which has a history of over 100% (annualized) volatility within the period of a week.

commitments to purchase aircraft (thereby avoiding financial distress). Thus, fuel cost levels tend to be negatively correlated with investment in new planes³⁹. Investors see the existence of the hedging premium⁴⁰ largely as the result of hedging on capital investment. Carter, Rogers, and Simkins (2006) found that the value premium associated with hedging increases with the firms' level of capital investment. These conditions suggest that, if the market expects airlines to invest their marginal cash flow in positive net present value projects, then investors should place positive value on the fuel hedging policies of airline companies. Conversely, if investors view such investment unfavourably, hedging would have negative value consequences (Carter, Rogers, and Simkins, 2002). This result implies that investors value hedging by airlines when they expect hedging to protect the ability to invest in bad times. Thus, hedging is regarded as a positive attribute in the investment process of airline companies.

Since jet fuel constitutes a large percentage of operating costs and the fuel price is highly volatile, airlines face a huge incentive to hedge fuel risk. Airlines also enjoy the opportunity to buy under-priced assets from distressed airlines during periods of high jet fuel prices and/or to protect the ability to meet previously contracted purchase commitments. Studies show that airlines employing jet fuel hedging trade at a premium, after controlling for other factors that affect value. Thus, hedging also adds value as the reduction of fuel price risk exposure is clearly economically significant (Allayannis and Weston, 2001; Carter, Rogers, and Simkins, 2002). The value of the interaction provides the vast majority of the hedging premium.

³⁹ However, increasingly new designs of aircraft are based on achieving improved levels of fuel efficiency and there will increasingly be a motive to purchase new planes to achieve improvements in fuel efficiency.

⁴⁰ Calculated from the added firm value attributable to hedging by the firm.

Corporate value and hedging research studies (Carter, Rogers, and Simkins, 2006) on U.S. Airlines indicates that the most active hedgers of fuel costs are the larger firms in the sample with the least debt structure and highest credit rating⁴¹. Smaller airlines are less active possibly due to a lack of either sufficient resources or the strategic foresight to acquire a derivative hedging capability, and airlines' relatively low costs of financial distress. Large airlines may have higher financial distress costs, but such firms may also have the most to gain from hedging.

3.4 Controllable variables

3.4.1 Dividends

In addition to the risk factors mentioned above which affect firm value, dividends are one of the control variables consistent with the regression analysis of Allayannis and Weston (2001), who included a dummy variable if the firms paid a common dividend during the current year. Firms with foreign sales show a negative relation between the dividend dummy and firm value, while firms with zero foreign sales show a positive relation between the two. Firms paying dividends are less likely to be capital constrained (Fazzari, Hubbard, and Petersen, 1988) and, therefore, may over-invest by accepting negative net present value projects. On the other hand, dividends may be seen as a positive signal from management (especially in an industry that has experienced a significant number of bankruptcy filings). Additionally, the initiation or increase

⁴¹ Study uses S&P Credit Rating System for Senior Debt of Sample Airlines.

(elimination/reduction) of a dividend is likely to be seen as positive (negative) by the market (Allayannis and Weston, 2001).

Most previous studies have focused on the existence of a single risk exposure such as interest rate risk or only the exchange rate exposure. For the transportation industry, studies have mainly emphasised jet fuel price hedging, ignoring currency and interest rate risk (Carter, Rogers, and Simkins, 2002). In contrast, the current study follows the methods employed by Loudon (2004) to examine interest rate, currency, and fuel price exposures simultaneously. Many studies have focused either on aggregate factors from the industry or on in-depth research into the broad spectrum of the individual companies. The result of these studies may disclose the effect of the exposures to the company or industry without controlling for the industry effect (Williamson, 2001). The current study focuses on the analysis of the company within a single industry in a specific context.

The next chapter will focus on the data collection process, methodology used, and the source of database, highlighting the critical occurrence of financial risk exposures included in this study. This study will also extract certain important data from SAA and Comair for visual comparison in the next chapter.

Chapter 4. Data collection, technical analysis and methods

Chapter 4. Data collection, technical analysis and methods

This chapter explains the research methodology involved in the data collection, including the types and resources. This is followed by a technical analysis of the data chart, which explores the patterns of the risk factors. A table of selected airline characteristics presenting a ratio analysis of the financial statements serves as a helpful tool to compare the operational performance and anticipated future conditions of the airlines. Lastly, detailed formulae are outlined, and linear and non-linear risk exposure methods are employed to analyse the correlations between the factors and the resulting effects on airlines returns.

4.1 Data collection

The sources of data in this research differ from the study by Loudon (2004), with data collected from several South African and international databases. The database used for Loudon (2004)'s study – DataStream (DS) - does not have sufficient historical information covering South African economic data, nor the equity price information for our study objects. Therefore, the data in this study are collected from numerous sources, including the JSE Securities Exchange and the South African Reserve Bank.

Certain daily raw data were collected and averaged out into weekly data such as the South African Prime interest rates, exchange rates, jet kerosene prices, and the share price of Comair. Primary lending interest rates were collected from the South African Reserve Bank (SARB), while exchange rates and fuel prices were collected from the

McGregor BFA Mweb Database (BFA). The daily individual share return of Comair was collected from JSE and Computer Share (CS), and the annual financial reports of SAA were extracted from the SAA and Transnet websites. Major airline⁴² return data were obtained from Interactive Data Corporation, with the U.S. and Canadian historical stock prices and US indices prices provided by CSI, Inc, U.S. historical mutual fund and industry prices provided by Media General Financial Services, and the S&P Airline (industry) Index provided by Index Services at Standard & Poor. These data are used for indicating average market returns in linear and non-linear calculations as well as providing benchmarks for our study objects.

Data are collected for the period of 22nd July 1998 to 31st December 2005, and the starting date of the sample corresponds with the public listing date of Comair on the JSE. As SAA is a state-owned unlisted airline, the annual report is published but the daily equity returns are not. This gap of missing information is overcome by obtaining the measurement of return on investment of SAA from the Annual Financials and standardised data into periodically returns in order to conduct comparison with Comair. Although the shareholder's composition varies in these two airlines, there are however still sufficient similarities exist amongst the two companies. Besides the Airline Characteristics included in this study, both SAA and Comair have been financially supported by the South African and British Government respectively; both airlines are now covering high end and low end market with similar strategies; and are highly sensitive to currency fluctuation and jet kerosene price exposures. Data used in this

⁴² Major airlines include: World Air Holdings, North West Airlines Corp, Delta Airlines, Continental Airlines Class B, China Southern Airlines Co Ltd, China Eastern Airlines Corp, British Airways, AMR Corp, and Air France ADS.

study can be categorized into daily (closing prices of exchange rate, jet kerosene price, S&P Industrial Index, and the listed share price of Comair), weekly (major airline returns), monthly (South Africa Prime interest rate) and annually (annual financial statements) information. The Industrial Index in S&P discloses the global listed airlines and the industrial performance. Although South African airlines may not be significant in the contribution of the weight, it still serves as a useful global indicator.

Short-term government interest rates or bonds are often employed to depict the risk-free rate indicator, which is used to compute excess returns. The three month Treasury bill rate is used for Comair in this study as the risk-free interest rate indicator whereas SAA⁴³ states that the domestic loan interest rates⁴⁴ are obtained from South African Government to secure the aircrafts. Excess returns are calculated and reflected in the South African Rand (ZAR) by both airlines. Although companies may determine excess returns using long-term bond yields, the current study uses the short-term rate, as this is more in line with CAPM. Measures of interest rate risk are proxied by changes in the long-term fixed interest rate rather than the short-term counterparts, as the majority of airline debt financing is long-term and denominated in local currency.

As these airlines generate their income and revenues in many different currencies, our study airlines use USD and ZAR denominate debt structures. Loudon (2004) uses changes in the trade-weighted indexes of the relevant domestic currency to assess

⁴³ SAA obtained a domestic loan with an effective interest rate at 10.3%, which was secured by the aircraft. The foreign secured loans in US Dollar used interest rate between LIBOR +2 and LOBOR flat, secured by the aircraft and capitalised lease improvements paying interest between 2% and 6% per annum with repayment between 2005 and 2012. (SAA Financial Annual Report: 2005)

⁴⁴ Both Comair and SAA used the domestic effective interest rate method for borrowing costs to achieve a constant rate of interest on the remaining balance.

foreign exchange risk in his study, though this method appears to be the most useful, but imperfect. In our study, the financials of the airlines are expressed in ZAR resulted from a translation at the average exchange rates, unless the fluctuation was significant. Specifically with SAA, exchange rate risk is covered by managing the exposures in its cost base denominated⁴⁵ together with cash collection and conversion strategies at marked to market on daily basis (SAA Annual Financial Report: 2006). In addition, as major debt, equity and purchase of assets are conducted in ZAR and USD respectively, thus, the daily closing rate of ZAR to USD is used to assess foreign exchange risk, as it appears to be the most appropriate figure for this study.

Lastly, the differences in fuel prices are measured from changes in the USD price per barrel of jet kerosene, F.O.B. Singapore, which is used by Comair and SAA. This is in align with Loudon (2004)'s method and which the jet kerosene price is converted into equivalent ZAR value by using the daily USD to ZAR closing rate to minimise currency effects from fuel price effects.

4.2 Technical analysis

Appendix 3 in this study discloses the daily movement of the key financial risk variables throughout 1998 to 2005. Appendix 3.1 shows the South African Prime interest rate in percentage per annum; Appendix 3.2 presents the exchange rates of one US Dollar to the South African Rand at a weekly rate resulting from the average of the daily closing rates. Appendix 3.3 graphs the jet kerosene price per barrel in US Dollars.

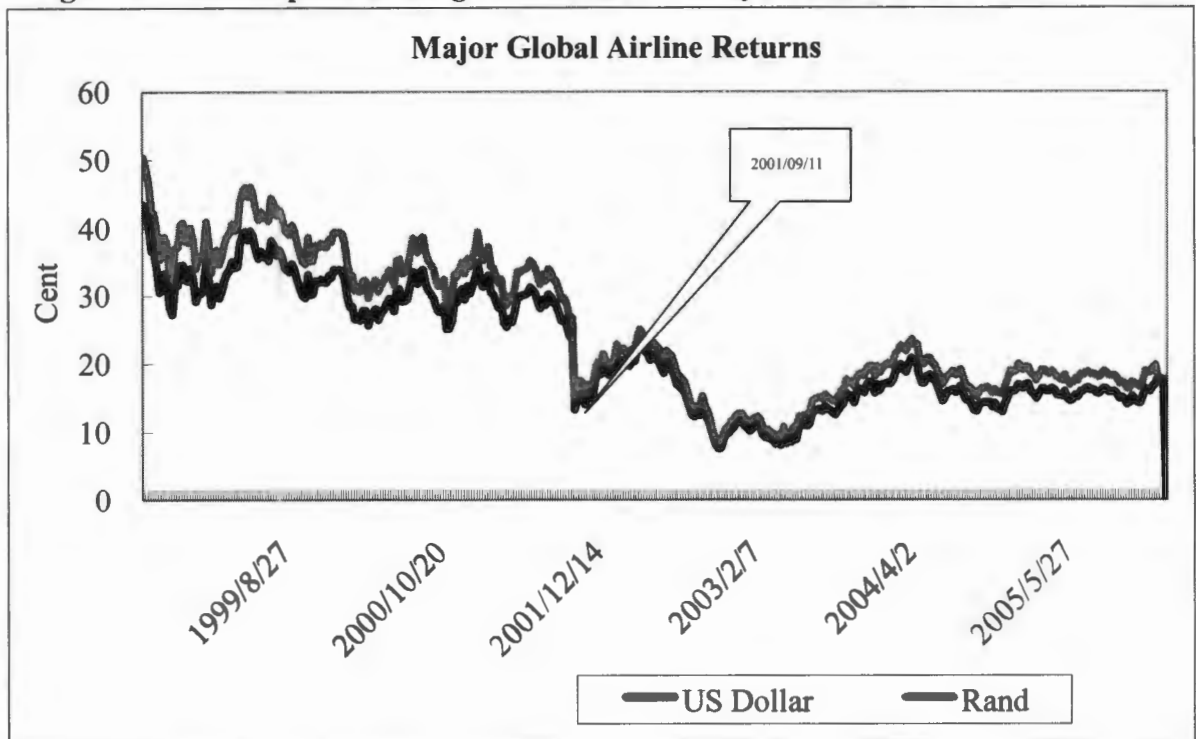
⁴⁵ Calculating revenue and expense in the currency it received and natural hedges exist in its business operations.

In Chapter 2, the negative effect of the weakening of the Rand in 2002, which led to significant increases in fuel prices for the airlines, was discussed. Therefore, Appendix 3.4 demonstrates the price movement of jet kerosene per barrel together with the effect of the corresponding exchange rate. From these figures, we see that the trend of fuel prices in 2002 is higher than Graph 3.3 of the same appendix, and this impact somehow causes South African companies to incur enormous losses in 2002, including the companies in our studies. These graphs allow readers to visualise the patterns of the risk factors and their impact on the returns, which this study analyses, as well as the possible gains for the airlines from managing these risks effectively.

Figure 10 below graphs the average performance of the sample of major global airlines⁴⁶. Two trend lines display the average return in US Dollars and its equivalent value in Rand value to compare with our study subjects. In 2002 the Rand collapsed against the US Dollar and in Rand terms, resulted expecting a dramatic increase in Rand returns as the Rand fell and the returns are stated in US Dollar terms. Original, detailed Individual Global Airline Performance is listed in Appendix 4 in US Dollars. Both Figure 10 and Appendix 4 clearly show that the global airlines experienced negative material impacts from the terrorist attacks which resulted in general performance of the share price declining from September 11, 2001 onward. The attack caused an instant 46% decrease of global airline share value with no signs of a price increase afterward.

⁴⁶ Major Airline Industry Returns are used to signify the global industry returns and have been converted into ZAR at the relevant exchange rate. ZAR is used instead of USD as it is the primary currency used by both airlines. Therefore, it is unnecessary to convert into USD as Loudon did.

Figure 10 Share price of the global airline industry from 1998 to 2005



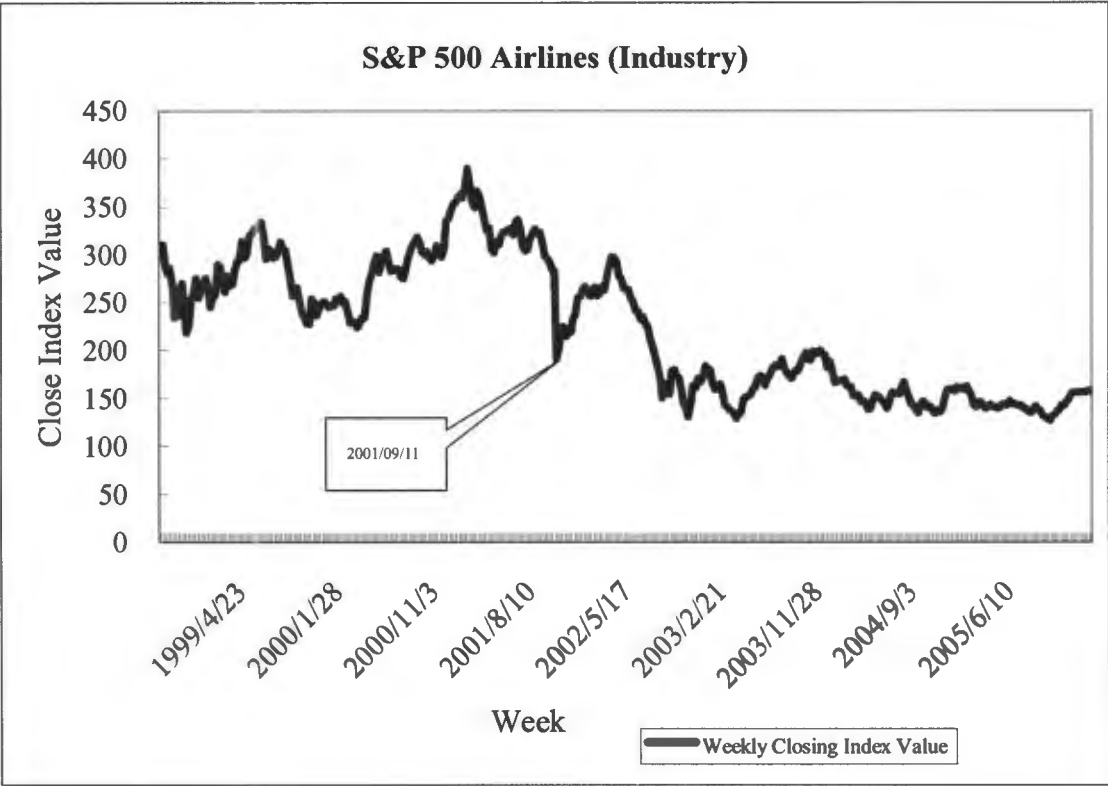
*Source: McGregor BFA Mweb Database (BFA)

Unlike the performance of SAA and Comair, the impact of the weakening of the Rand in 2002 shows a minor effect on the weekly prices of the global airlines compared with the degree of changes which the terrorist attack caused. The diminutive effect was partly caused of the low share prices after September 11, 2001, which led to a lesser extent of fluctuation then what we expected initially.

Figure 11 below shows the S&P 500 Airline Index from 1998 to 2005, in which the moving pattern is similar to Figure 10 above, and the S&P initially increased for a short period before decreasing in March 2003. Appendix 5 displays the S&P500 Index adjusted Closing Price for the period of 1997 to 2005 to compare with the S&P 500 airline industry performance. Both S&P graphs demonstrate the direct impact of the

terrorist attack on the closing index and value, which matches with global airline performance in Figure 10 and Appendix 4. The effect of the attack shows in Figure 11 and Appendix 5, which reflects a decrease in their value of 28% and 11.5%, respectively, immediately following the transaction date of September 11, 2001.

Figure 11 S&P 500 Airlines (Industrial) Indices



*Source: S&P Index Services.

In Figure 11, S&P 500 Airlines shows growth until February of the following year after the sudden performance decrease from the attack. This encouraged investors to rate the Aviation Sector as a revitalising industry for the period. However, the global economy suffered a setback and this was reflected by the weak performance in the airline sector. Thus, the performance in March 2003 decreased after a short peak and remains low

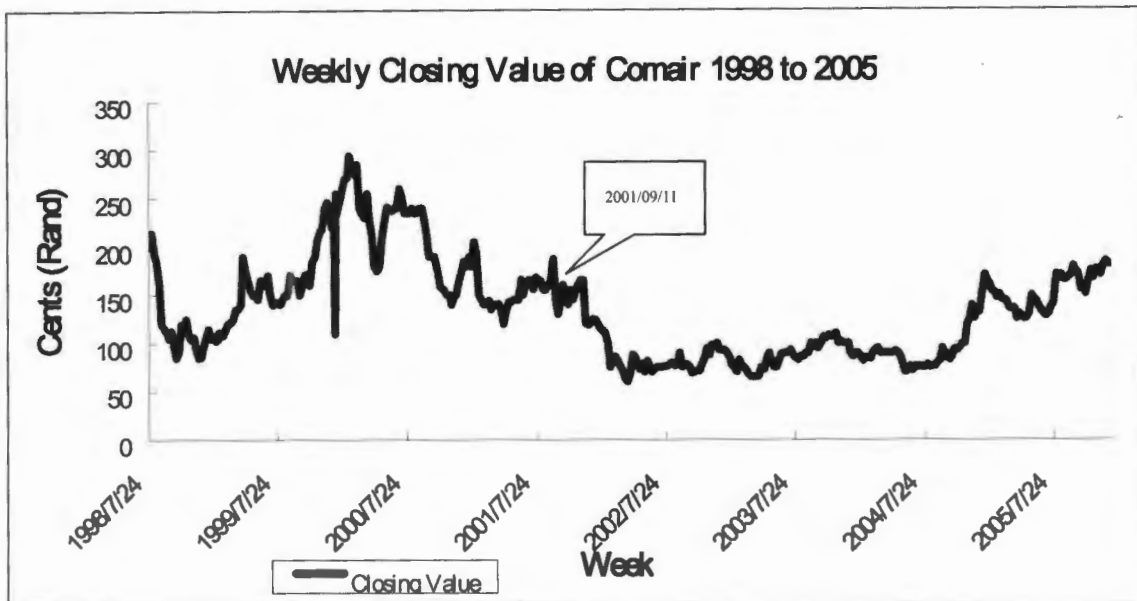
until the end of the study period. Although the S&P 500 Index ascends gradually, the Airlines Indices indicates no sign of increasing their value. This phenomenon was regarded as a dark and frustrating period for the global aviation sector, including our study subjects⁴⁷.

The share price patterns of the companies included in this study are presented in Figure 12 below with the Weekly Closing Price of Comair from 1998 to 2005. To be more specific and in contrast to inspecting the effect of the incident of September 11, the serious losses which Comair disclosed tend to be, in general, unconnected to the terrorist attack. For other global airlines, the terrorist attack represented the commencement of a recession for the sector.

Compared to the decline in the major airlines' performances, Comair shows growth before the year 2000, but the growth started in 2005 after a long recession period from 2002 to 2004. In contrast, SAA reported significant losses on the shareholders' investment until the first quarter of 2004, when the exchange rate effect started to attribute positive impacts for the company. Improvements in macroeconomic conditions in 2004 resulted in positive effects for the aviation sector and have led to a reawakening of global aviation and an improvement in financial performance.

⁴⁷ International study conducted by IATA (2006) also illustrated that, globally, airlines have suffered net financial losses of over USD 40 billion between 2001 and 2005.

Figure 12 Weekly Closing Price of Comair from 1998 to 2005



*Source: Johannesburg Stock Exchange Data Service and Computer Share

The movement of airline returns is analysed in Figure 6, 7, 10 and 11, for SAA and Comair, global airlines, and the S&P Index, respectively. Declines in performance returns are noticed for SAA, Comair, and the global airline industry, especially around 2001. The financial performance of airlines did not stabilise and improve until 2004. As this common trend applied to both the domestic and international major airlines, it is noticeable that changes in financial risk factors might have had a positive influence during certain periods which led to an improvement in the aggregate performance of the airlines.

It is essential to investigate the trends of the financial risk factors during the study period. The movements of the exchange rate, interest rate, and oil prices are graphed in Appendix 3 consistent falling interest rate effect is shown in Appendix 3.1, except for a period of rising rates during 2002. The increase of the rates started immediately after

mid-2003, followed by a decrease within the next two quarters. Financial analysts explain the decrease in the interest rate and a resurgent economy occurring from 2003 as the result of foreign investment and encouragement of local entrepreneurship, reflected by GDP growth to reach the highest figure of 5% (2005) within the decade.

The movement of exchange rates, which fluctuated to an enormous degree, especially when it reached the highest depreciation point within our study period at ZAR13.65 to USD 1 at the end of 2001 and the highest appreciation point of ZAR 5.52 to USD 1 in 1998, is illustrated in Appendix 3.2. The exchange rate, as shown in the figure, mostly remained within the range of ZAR 5.50 to ZAR 8.30 to USD 1, except for a sudden depreciation which resulted in an inverted “V” shape in 2001. This incident had significant impacts on corporations which had major transactions in foreign currencies. Currency risk is one of the most significant economic risk factors in South Africa, as the daily rate can fluctuate up to 10% occasionally or even up to 40% within a week (during November 2001). Financial analysts also predict that the South African Rand will be one of the most risky currencies to trade in for the next few years. This encourages corporations to use efficient risk management instruments besides hedging for jet fuels in order to protect the company’s profits and reduce possible currency fluctuation risk.

In addition to exchange rate changes, fluctuations in jet kerosene prices is also a crucial factor for airline companies, especially when the jet kerosene prices are constantly increasing, as presented in Appendix 3.3 and 3.4 in Appendix 3. There is a substantial upward growing trend in fuel prices from levels below USD 30 in late 1998 to levels

above USD 106 in October 2000. Another upward intermediate peak trend is from the level below USD 65 in October 2003 to the highest levels above US 203 in September 2005. Appendix 3.3 shows a sudden change in fuel prices in 2003 and reflects the commencement of a period of continuous incline, which was the result of boycott action from OPEC members against the declaration of the Iraq war (www.opec.org). The constant increase⁴⁸ in fuel prices has a negative impact on the future financial performance of airlines and indicates their vulnerability to this uncontrollable factor. It is also important that this study investigate imported jet fuel prices in terms of South African Rand values. Thus, the combined effect of fuel prices and the exchange rate is presented in Appendix 3.4, which shows that the gradient of movements is steeper as compared to Appendix 3.3. In other words, the exchange rate risk factor is crucial and may have a negative impact on South African airline companies when they purchase jet fuel with Rand.

In order to perform basic financial analysis of the individual airlines and to follow Loudon (2004)'s research, this study selects certain key operational characteristics of SAA and Comair, where figures are collected from the annual reports and presented in Table 5 below. These measures are relevant for assessing the potential importance of exposure to interest rate, currency, and fuel price risk. The table reports statistical data sourced from the airlines' annual reports. SAA and Comair end their financial fiscal year on the 31st of March and the 30th of June, respectively. Foreign Sales is the percentage of total revenue derived from geographic regions outside the domestic

⁴⁸ The constant increase in fuel prices resulted from the increase in OPEC numbers, where every country urges consolidating the World Fuel Market Price, declaration of war in the Middle-East, and the forecast of supply shortages within the next fifty years. Therefore, it is foreseen that fuel prices will continue to increase until a substitutable resource has been discovered and is used on a sustainable basis.

country, with the main country in this study being South Africa. Fuel Cost shows the cost as a percentage of total airline operating expenditure, excluding depreciation, amortisation, and interest. Unlike Loudon's (2004) study, Debt to Total Asset ratio is used instead of Gearing ratio as South Africa government has subordinate loans to SAA which become effectively equity finance on the balance sheet. Off-gearing is the same as Gearing, except that it also includes off-balance sheet financing⁴⁹. In this study, this covers the sum of total assets, total liabilities, and the deferred tax value. Interest Cover is earnings before interest and taxes (EBIT) divided by net interest expense. Long-term liability is the ratio of non-current debt to total liabilities, as recorded in the balance sheet. Revenue Seat Factor is the ratio of revenue passenger kilometres to available seat kilometres. As some of the required data is unavailable due to the confidential disclosure policy of the company, Loudon (2004)'s results are extracted in Appendix 7 to compare to the characteristics of our study subjects.

Table 5 below shows that Foreign Sales, which is an important factor in determining sensitivity to currency exposures for both airlines, shows diversified results due to different company strategies and differences in operations. Comair reflects limited foreign sales data in the analysis⁵⁰ by only showing 12 per cent in 2005, while SAA has substantial international revenues. However, the domestic market of Comair reflects a growth of approximately 14 per cent in 2005 as the result of focusing on the domestic market and a growth in market share due to the low prices of kulula.com and quality

⁴⁹ Off-balance sheet item refers to an asset or liability which is not reflected on the balance sheet because of management judgement or accounting policies. In the airline sector, this relates mainly to the use of operating leases to finance the acquisition of aircraft.

⁵⁰ Comair states that all foreign currency transactions are recorded at the exchange rate ruling on the transaction dates. Therefore, the effects of the foreign exchange on the daily international sales are absorbed and reflected in the earnings.

service of British Airways. As SAA is more focused on the international market, foreign sales revenues range from 34 per cent (1999) to 59 per cent (2005) of the company turnover, which is higher than Qantas but lower than Air New Zealand (Appendix 7) if we compare the results to those of Loudon's (2004). Differences in foreign sales mean that the impact of exchange rate risk exposure has different degrees of influence for the airlines. SAA may encounter more currency exposure risks than Comair in terms of sales revenues. Having foreign sales may, however, result in a greater opportunity for the airlines to benefit from natural hedging and reduce the net foreign currency exposure effects due to costs being stated in foreign currency.

Table 5 Airline Characteristics of SAA and Comair

Fiscal Year	1998	1999	2000	2001	2002	2003	2004	2005
Panel A: SAA								
Foreign Sales	n.a.	34.7	34.9	36.2	55	41.5	58	59
Fuel Cost	n.a.	n.a	n.a	19.5	18.8	21.2	19.1	20.8
Debt to Asset	n.a.	n.a	n.a	17.26	20.24	23.64	27.32	58.50
Gearing Incl. Off	n.a.	n.a	n.a	46.8	53.1	-272.5	-169.8	-542.2
Interest Cover	n.a.	n.a	n.a	1.7	5.8	-12.5	-12.1	2.8
Long-term Debt	n.a.	n.a	n.a	26.5	29.1	21.5	23.3	52.8
Revenue Seat Factor	n.a.	n.a	n.a	66.6	67.1	68.4	67.5	70.4
Panel B: Comair								
Foreign Sales	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fuel Cost	7.9	9.6	8.3	9.3	11.2	15	20	26
Debt to Asset	-0.83	28.57	23.37	23.86	21.14	1.41	21.87	26.33
Gearing Incl. Off	-1.6	62.5	45	50.3	43.5	2.9	64.6	68.3
Interest Cover	120.7	40.1	5.7	3.5	0.4	-1.3	-2.7	4.8
Long-term Debt	n.a.	47.1	43	48	45.3	6	41.7	35.8
Revenue Seat Factor	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

*n.a. indicates data is not available

*Source: Annual Financial Reports of SAA and Comair from 1998 to 2005

In regards to jet fuel cost exposure, both airlines have reported that fuel costs are a major component of airline operating costs. Fuel costs account for between 19 and 21 per cent of the total operating expenditure for SAA, and 8 per cent to 26 per cent for Comair⁵¹. An important finding in this data is an increase in the percentage of this ratio in the latter period for the airlines. Especially for Comair, the proportionate cost is slightly higher and the gradient of movement⁵² is steeper during our study period. Comair's 2005 Financial Report shows a 32 per cent average increase in the dollar price of jet kerosene, excluding the effect of the fuel surcharge on British Airways ticket sales, which may have contributed to the partial recovery of the fuel price increase. Both our study airlines have deployed accounting policies to implement risk management system effectively in order to assist airlines' risk department to measure the diverse risks that the airlines face. To cover jet fuel price risk⁵³, SAA has a Board approved policy of not hedging its fuel price risk exposure completely (SAA Annual Financial Report, 2005). The policy hedges partial jet fuel price risk exposures by using derivative contracts, which are marketed to market and settled in cash⁵⁴. On the other hand, Comair categorises transactions denominated in foreign currency under foreign currency risk management. Comair uses forward exchange contracts to manage exchange rate exposures and does not speculate in derivative instruments (Comair Annual Financial Report, 2005). However, the increase in the fuel component for Comair has been

⁵¹ Comair recorded a huge difference in fuel proportion from 8% to 26%. This is due to the fact that Comair commenced business with a few jets, which translated into a lower proportion of fuel expenses compared to SAA, but as the number of jets increased, fuel weight in total expenditures increased accordingly. It is also important to notice that, SAA may have more planes which are generally newer than those of BA, kulula.com and new planes are more fuel efficient.

⁵² SAA and Comair fuel price movement gradients are 0.6 (3/5 years) and 1.6 (8/5 years), respectively.

⁵³ Jet fuel price risk is derived from the increased cash costs due to an increase in Brent crude oil prices which leads to a concomitant increase in Brent crude oil by products, i.e. jet fuel.

⁵⁴ SAA's risk policy permits the airline to hedge jet fuel price risk exposures on a 12 month rolling basis (Financial Report, SAA, 2005).

mitigated by the strong Rand, which has reduced the effect of the high dollar cost of jet fuel. The addition of aircraft on an annual basis as well as the lack of risk management of fuel costs may contribute to this material increase. One of the driving considerations for aircraft procurement or the replacement decision is the fuel efficiency of each aircraft model. This may result in airlines attempting to deal with fuel price risk by replacing older planes with newer, more fuel-efficient planes. In the current study, it appears that Comair has not implemented specific risk management policies to deal with the fuel price exposure, but has implemented hedging policies to deal with other risk factors, which will be reviewed later.

Table 5 also shows that both airlines are relied heavily on the usage of balance sheet for capital financing or other purposes. The Debt to Asset ratio increases during the study period for both airlines, however, Comair shows a raise from 2004 as the utilization in debt facility has been increased to cover transactions such as collateral covering security or bridging other instalment sale agreement.

Having observed the interest rate exposures, both airlines show extremely high gearing ratios, with debt being predominately of a long-term nature. The result of the gearing ratio, including off-balance sheet debt, ranges from negatives to 52 per cent for SAA and from 48 to 1 per cent for Comair. For SAA, with negative figures reflecting its shareholders' interest from 2003 to 2005, the gearing indicates that debt exceeds shareholders' equity value and that the airline had extremely high interest rate exposures during those years. However, Transnet and the government had provided security guarantees, which amount effectively to equity, as the government is the

shareholder of SAA. Thus, Transnet has pledged that SAA receive R4 billion compulsory convertible loans to balance the gearing ratio for the future, as SAA is vulnerable to further interest rate risk. The average year-end ratios of long-term debt to total debt, as recorded in the balance sheet over the sample, was 53 per cent for SAA and 48 per cent for Comair. Thus, with its higher gearing levels, coupled with a much lower interest cover, SAA shows higher exposure to interest rate risk than Comair for the entire study period.

Revenue seat factors are deployed as another key operational characteristic to evaluate the performance results of risk management policies and practices, including changing the price structure and other capacity decisions. The revenue seat factor is calculated as the ratio of revenue passenger kilometres (RSK) to available seat kilometres (ASK), and provides measures of capacity utilisation. An average annual revenue seat factor is 68 per cent for SAA, as shown in Table 5. Comparatively, both Qantas and Air New Zealand have a higher rate in every year in the sample of Loudon's (2004) study (Appendix 7). From the perspective of global aviation, this shows that SAA has less of a competitive advantage compared to the other international airlines.

Revenue seat factor is unavailable for Comair, but with regards to risk management and its flexibility in adjusting strategic decisions, the airline should concentrate on effective risk management at this stage. According to Comair's annual report in 2005, financial risk management only covers interest rate, credit, liquidity, and foreign currency risks. The company states that there is no speculation in derivative instruments and all the foreign contracts are supported by underlying transactions.

4.3 Data Methods

After extracting data from the financial reports, the next data analysis entails examining the significance of the risk exposures, which are conducted by employing both linear and non-linear coefficient methods according to Loudon (2004). Statistical definitions and their applications will be detailed to explain the reasons for their use.

4.3.1 Linear risk exposures

Compared to internal managers, who have access to inside information for the prompt evaluation of sensitivity to key business risks, external analysts are often restricted to limited public data such as share prices, market portfolios, and macroeconomic data. The use of the linear risk exposures method is thus derived from the external analysts who use the analysis method on the foreign exchange risk in Adler and Dumas (1984)⁵⁵ to measure the operational measures of exposure to other financial risks. Adler and Dumas have also proposed that the partial regression⁵⁶ coefficients from a multiple linear regression of firm value on the vector of exchange rates provide operational measures of exposure to individual currencies. This means that exposure to the K business risk factor can be estimated by regressing stock returns on the returns associated with the underlying risks, that is

⁵⁵ Exposures are defined as the change in the market value of the firm in response to a change in the value of each currency to which the firm is exposed.

⁵⁶ Regression means that X variables are fixed or specified by the experimenter before data collection.

$$R_{jt} = \alpha_j + \sum_{k=1}^K \beta_{jk} R_{kt} + \varepsilon_{jt}$$

where R_{jt} is the return on the j^{th} stock and R_{kt} is the innovation in the k^{th} risk factor.

As is normal practice in other studies, most of the results have been compiled based on the correlations⁵⁷ of two variables whilst the other potential factors are neglected. The commonly used model is linear-regression, where both variables are different from one replication to another and, thus, sampling error is involved in both variables. To minimise possible economic variable bias, the current research includes the industrial market return when estimating exposure coefficients. This, however, enables and includes the impact of other market influences, such as the effect of macroeconomic factors on the individual asset returns. As this procedure significantly improves the suitability of the model and reduces the standard errors or the exposure coefficient, Bodnar and Wong (2001) have emphasised that it may change the interpretations of the coefficient estimates. However, it is important to note that, even if the market itself shows non-zero exposure to the risk factors, the zero exposure coefficients may imply that the firm's exposure is the same as the market. It does not imply that the firm has zero exposure to a certain factor.

Therefore, in order to enable the usual interpretation while attaining the benefits of including the market return, this study only includes the part of the market return that is orthogonal to the risks in the analysis. This means that the residuals from regressing the market return on the risk factors are used in place of the actual market returns, and the double counting effect from other risk factors is eliminated from such an equation.

⁵⁷ Correlation describes the situation in which both X and Y are random variables.

Exposure to risk factors such as the interest rate, currency, and fuel prices are thus estimated from the following regression equation:

$$R_{jt,t+T} = \alpha_j + \beta_{jl}R_{lt,t+T} + \beta_{jx}R_{xt,t+T} + \beta_{jf}R_{ft,t+T} + \beta_{jm}R_{mt,t+T} + \varepsilon_{jt,t+T} \quad (1)$$

where $R_{jt,t+T}$ is the excess return on the individual airline; α_j is the level of significance at 0.01, 0.05, and 0.10; β_{jt} is the standard regression coefficients of the respective risk factors; $R_{lt,t+T}$ is the change in the long-term interest rate; $R_{xt,t+T}$ is the change in the exchange rate; $R_{ft,t+T}$ is the difference in the fuel price factor; $R_{mt,t+T}$ is the part where the excess national market return is orthogonal to the other risk factors; and ε represents the residuals from regressing the market return on the risk factors, which replaces the actual market returns. Returns are computed as the log of the price/rate relative over the interval from t to T , where T equals 1, 2, 4, 13, 52, and 156 weeks. To assess whether the exposures are jointly significant, robust Wald X^2 test statistics are computed with Statistica. These test the null hypothesis that $\beta_{jl} = \beta_{jx} = \beta_{jf} = 0$.

Studies by Jorion (1990) and Loudon (2004) provide evidence of foreign exchange exposure using monthly return intervals, but indicate a lower than expected incidence of statistically significant exposure. This result coincides with “the exposure puzzle⁵⁸” cited in the literature. However Chow, Lee, and Solt (1997) argued that, since the

⁵⁸ Based on basic financial models and reports in the business press, exchange rate movements are generally believed to affect the value of non-financial firms. In contrast, empirical research on non-financial firms typically produces fewer significant exposure estimates than researchers expect, independent of the sample and methodology used.

long-term effects of current exchange rate changes are difficult to evaluate and are progressively exposed through time, long horizon returns may be more informative about the true degree of exposure. Similar currency trends were discovered in the study of Di Iorio and Faff (2001) based on Australian industries. Since it is probable that forecasting the long-term effects of interest rate and fuel price changes will present likely trends as the exchange rate changes, a similar effect is expected to apply for these risks in the current study. In the current paper, several multi-week horizons, as mentioned above, stretching out to three years, are used to examine the horizon issue.

In order to implement a multi-week horizon analysis, this study measures the multi-week return at the end of each week by using all available past weekly returns up to the indicated horizon length. This maximises the usage of the sample information but may create the problem of serial correlation, as the returns are overlapped with an increasing horizon length. This problem is adjusted for by using the method of Newey and West (1987) with standard efforts for serial correlation, which is also robust to heteroscedasticity⁵⁹.

4.3.2 Non-linear risk exposures

After examining risk exposures using linear methods, this study tests the significance of the risk exposures employing non-linear methods, because the exposures may be non-linear to the company. The asymmetries in exposure may be caused either by the

⁵⁹ Heteroscedastic describes a data sample or data-generating process in which the errors are drawn from different distributions for different values of the independent variables (economics.about.com/cs/economicsglossary/g/heteroskedastic.htm).

underlying exposure itself if it is non-linear, or the hedging activities of the company, which induce the non-linearity of the exposure risk as the selective hedging methods, or the usage of asymmetric hedging instruments by the company, have an impact on the significance of the exposures themselves. A study by Brown, Crabb, and Haushalter (2001) supports the non-linearity risk exposure statement, as the company may selectively hedge, and the hedging strategy varies through time in response to changing market conditions. Generally speaking, airline accounting management policy states that derivatives are not used for speculative trading purposes, but as a tool of financial risk management. Somehow, if the hedging is not completed but contains discretionary elements, the distinction between hedging and speculating becomes unclear.⁶⁰

Di Lorio and Faff (2000) introduced the method of options hedging motives, which may induce the possible non-linear exposure inclusively in the asymmetric format for the currency exposure regressions. This study was conducted within the Australian industry, with the findings compiled across industries and data frequencies. Similar evidence has been found for the interest rate regression in a sample of non-financial German firms (Bartram, 2002).

Therefore, to investigate whether exposures have non-linear characteristics, this research distinguishes between exposure during times of positive, negative, and neutral (i.e. small) changes in non-market risk factors. To do so, we extend equation (1) to

$$R_T = \alpha + \sum_{q=1}^3 \beta_{qI} D_{qIT} R_{IT} + \sum_{q=1}^3 \beta_{qX} D_{qXT} R_{XT} + \sum_{q=1}^3 \beta_{qF} D_{qFT} R_{FT} + \beta_m R_{mT} + \varepsilon_T \quad (2)$$

⁶⁰ Both SAA and Comair state in their accounting policies that the effective portion of the gain or loss derived from the hedging policy is recognised immediately in equity, whereas the ineffective portions are brought over to the income statement.

where D_{qkT} are dummy variables set equal to one when the K^{th} factor innovation is either zero, neutral ($q=1$), positive ($q=2$), or negative ($q=3$). Innovations are classified as neutral for a particular risk factor if the figure falls within plus or minus half the standard deviation of all sample innovations. Positive or negative innovations are those falling outside of this range in either direction. All other variables are the same as for equation (1). To simplify notation, as in Loudon's (2004) study, this calculation excludes the firm subscript in equation (2) and uses the time subscript T as shorthand for the variable length time horizon from t to T . As above, when estimating linear exposure, T will be equal to 1, 2, 4, 13, 52, or 156 weeks. Multiple horizons are used to assess whether the asymmetric exposure is horizon-specific.

The current study will also use the Wald test to determine whether significant asymmetric exposure exists for each risk factor. The test of the null hypothesis is for the K^{th} risk factor, $\beta_{1k}=\beta_{2k}=\beta_{3k}$. Similar to the linear risk exposure calculations in order to measure the estimate on the overlapping returns from multi-weeks, heteroscedastic autocorrelation, which consists of standard errors, is used to assess the significance of the exposure coefficients.

This chapter presents basic characteristics as well as the financial and operational data of SAA and Comair. To present a broader view of the global aviation industry for comparison with our study subjects, data from other international global airline companies are also used. The technical analysis presents perspectives from the balance sheet and statistical results to provide more complete information on, and investigation of, the airlines. After defining the formulae of this research, we present the results

obtained directly from utilizing the equations mentioned in Chapter 5. A brief comparison of the results of this study and those of our reference study – Loudon (2004) - is presented to provide a better understanding of the performance of SAA and Comair.

Chapter 5. Results and Analysis

Chapter 5. Results and Analysis

Financial variables are under the influence of unpredictable fluctuations in the market, which leads academic researchers to produce varying analytical results, even when identical formulae are deployed. As the study results vary in different scenarios, the outcome of the current research may deviate from that of Loudon (2004). It is possible for SAA, one of our research subjects, to show results which may be incomparable with other studies, as this airline presents an exceptionally poor equity structure in the financial reports during the study period.

The analyses in this study include calculating performance measures in both linear and non-linear expressions. It is also interesting to notice that, later in this chapter, the effect of a movement in one financial risk factor has a different result when the measurement method changes. For instance, interest exposure shows different degree of significant influences on the returns of Comair when implementing linear and non-linear expressions respectively.

5.1 Linear risk exposures

The linear exposure coefficients of the interest rate, currency, and fuel price risk for both airlines are detailed in Table 6 below. The figures extracted are beta coefficients, using equation (1) with the corresponding selected multi-week horizons of 1, 2, 4, 52, and 156 weeks. Results are produced by Statistica based on the linear regression equation in order to obtain exposure coefficients for interest rate, currency, and fuel

price risk. Rows labelled “Wald” contain robust χ^2 statistics from the Wald test of the null hypothesis, which assumes that the joint effect of the fuel, currency, and interest rate coefficients in equation (1) is equal to zero.

Academically, there are several statistical methods available to determine the relationships between the variables as well as the level of significance. These methods include, for example, multi-linear methods, ANOVA, and MANOVA⁶¹. In order to facilitate comparison with Loudon’s (2004) study, only the coefficients, Wald test⁶², and adjusted R^2 are reported, whilst the intercepts and market betas are neglected in this study.

Table 6 below presents mixed results with different levels of significance, where p equals 0.10, 0.05, and 0.01, respectively. Table 6 shows that interest rate exposure impacts SAA negatively across the short- and long-term horizons. This means that airlines performances are influenced negatively by the changes of the rates in the decision-making process of both short- and long- term time scales. Interestingly, Loudon (2004) made a similar assumption, expecting a negative and significant impact of interest rate exposure for Qantas and Air New Zealand, but the outcome was positive. The results for SAA demonstrate a significant influence as a combined effect of losses in market value and the interest-free loan from Transnet. Therefore, the estimation of

⁶¹ ANOVA and MANOVA are used to conduct an analysis of the variance of factorial designs with or without repeated measures. Both modules are included in general linear models, which includes both linear and non-linear measurement.

⁶² The Wald Test is a test of significance of the regression coefficient. It is based on the asymptotic normality property of maximum likelihood estimates, and is computed as: $W = b * 1/\text{Var}(b) * b$. The test is based on the behaviour of the log-likelihood function at the point where the respective parameter estimate is equal to 0.0 (zero); specifically, it uses the derivative (slope) of the log-likelihood function evaluated at the null hypothesis value of the parameter (parameter = 0.0).

the impact of net losses on the financial statements of SAA is expected to further influence the remaining financial factors.

Table 6 Linear risk exposures

Horizon in Weeks	1	2	4	13	52	156
Panel A: SAA						
Interest rate exposure	-0.6096 #	-0.6096 #	-0.6096 #	-0.6096 #	-0.4726 #	-1.0009 #
Currency exposure	-0.6583 #	-0.6583 #	-0.6583 #	-0.6583 #	-0.4620 #	-0.0873 **, *
Fuel price exposure	0.4645 #	0.4645 #	0.4645 #	0.4645 #	0.2519	-1.0187 #
Wald	0.0634	3.6661 *	0.0529	25.5491	0.1094	0.0589
Adjusted R2	0.5692	0.5692	0.5692	0.5692	0.31096	0.58173
Panel B: Comair						
Interest rate exposure	-0.2359 **, *	-0.2359 **, *	-0.2135 **, *	-0.1747 *	-0.0631	-0.2499 #
Currency exposure	-0.6542 #	-0.6542 #	-0.6536 #	-0.6018 #	-0.4455 #	0.0256
Fuel price exposure	0.1471	0.1487	0.1686	0.1891	0.1852 **, *	-0.5869 #
Wald	2.6381	0.0725	6.9820 #	25.0128 #	184.9254 #	283.45682
Adjusted R2	0.49874	0.49874	0.48246	0.68324	0.7012	0.48932

Note: ***, ** and * shows the coefficient is significant at either the levels of 0.01, 0.05, and 0.10, respectively.

shows the coefficient is significant at all levels 0.01, 0.05 and 0.10.

Currency exposure coefficients show a passive correlation in Table 6 with negative values across our study periods with the exclusion of the 156 week horizon. The effect of currency exposures on SAA and Comair becomes less significant as the time horizon increases. Currency exposure is only significant for the returns of SAA at the 5% and 10% levels, and there is no significance for Comair in Week 156. Compared to Loudon's (2004) findings, presented in Appendix 8, all currency exposure coefficients are significantly different from zero, except for the finding at the 52 week horizon of Qantas, which is only marginally significant at the 10% level.

In general, there appears to be the existence of a positive and significant effect of fuel price exposure on SAA, with the exclusion of Week 156, where the coefficient is negative. No significant influence is found in the Week 52 horizon. In Loudon (2004)'s study, there is evidence of a significant impact of exposure to fuel price risk of Qantas. As the example airline from Loudon's study (2004) demonstrates a negative coefficient of fuel exposure at all horizons, only the results from the 2, 52, and 156 weeks are significant at either the 5% or 10% level.

On the other hand, Comair had positive returns on the financial statements, with the movement of coefficients deviating more than the results of SAA. This is because the relevancies or significances become uncertain compared to SAA. Therefore, the analysis becomes crucial, as it indicates the directions of factor significance. The results are also more presentable in reflecting the exposure influence effect on local airlines, which present the direct effect from the local economy.

The results listed in Table 6 show that Comair had a negative coefficient for interest rate exposure over the market returns, and the variable is significant at the 5% and 10% levels across the short-term, at Weeks 1, 2, 4, and 13. However, there is no influence at the 52 week horizon. The results also show a negative and significant result of interest rate exposure over the long-term frame, indicating that the airline is vulnerable to long-term interest exposure.

Simultaneously, both SAA and Comair showed negative exposure to exchange rate risks, except that there are no findings at the 156 week horizon. This is because the

exposure was not significant for Comair at any level. This result was in opposition to our reference study, but matched their initial prediction.

Evidence from the analysis in Table 6 demonstrates that the fuel exposure is less significant for Comair in comparison to SAA, as for the most part the results showed positive coefficients without significant correlations for Comair. Concurrently, the results of the fuel coefficients were positive for Comair, except in Week 156. The variable is also significant at levels of 5% and 10%, but a figure of 10% is also present for the Week 156 horizon.

The result of the airline was in contradiction to our estimation, as well as the estimation derived from the study by Loudon (2004). The difference in our results compared to those of our reference study may be caused by the direct calculation of fuel prices in local currency instead of analysing it in USD. This conversion of fuel cost leads to a deviation in the result. This is not to state that currency exposure influences only one factor, as it influences others indirectly and presents the combined exposure effect on airline returns.

In addition to investigating the coefficients from the airlines and the different levels of significance, it is crucial for us to compare the results based on horizon. Merely considering the coefficients and significances at all three probability levels leads the results to present slightly more significant exposure over the short-term than long-term horizons. Short-term horizons are defined from Week 1 to 13, whilst long-term horizons are from Week 53 to 156. For example, sixteen out of twenty-four coefficient

observations are significant for the 1, 2, 4, and 13 week returns, whereas seven out of twelve coefficient observations are significant for the 52 and 156 week horizons.

This result is opposite of Loudon's (2004), who found that the exposures are more significant over the longer term. Our results show a small standard deviation of 66% for the short-term horizon and 58% for the long-term horizon. After a detailed breakdown, the analysis illustrates one of the reasons why this study shows contradicting results to our reference sample. Financial risk exposure has a 100% influence on the market value of SAA, which raises the weight proportion of significances in the short-term horizons across the two airlines.

In addition to this, the horizon effect may have reflected greater true exposure or simply measurement error from the raw data due to the diversification of the usage of directive data throughout time.

Results from the Wald tests of joint exposures on interest rates, exchange currency, and fuel prices are largely inconsistent with the above-mentioned discussion, especially for SAA. The result for SAA shows a non-significant Wald test except in Week 2, albeit at the 10% level only.

An average Wald test also shows a positive coefficient for the total effect on the airline returns. This shows that the returns are moving in the same direction as the total risk factors. On the other hand, more significance is found in the Wald test for Comair compared to SAA. The airline shows a consistent result with joint significances in

Weeks 4, 13, and 52. It is obvious that, as the time horizon extends, the coefficient for Comair increases. The coefficient was 2.4 times at Week 1 and moved to 283.24 times in the long-term horizon in Week 156. In Loudon's (2004) study, the Wald test shows that joint significance is largely consistent with the exposures. While none of the exposure coefficients is significant for Air New Zealand using the 2 week returns, the Wald test suggests joint significance, albeit at the 10% level only.

Generally speaking, the linear expression indicates that the explanatory power tends to increase with horizon length for Comair, especially for the longest horizons. As such, the findings for adjusted R^2 show no difference for the Week 1 and 2 results for the individual airlines. This is due to the fact that the data are comparable and the time horizons are nearly identical within such a short-term period. However, SAA shows a decrease from 56.92% to 31.01% and then another increase to 58.17% in the long-term horizon. Within the study duration, Comair displays from 49.87% to a highest of 70.12% in Week 52. This is followed by a decline to 48.93% at Week 156 as the next tier.

5.2 Non-linear risk exposures

The results from Table 7 below summarise the exposure coefficients for interest rate, exchange currency, and fuel price risks as estimated from non-linear regression equation (2) for selected multi-week horizons. To follow Loudon's (2004) methodology, intercepts of the equation, global market betas, and robust standard errors are omitted in the current study. The statistical tool used is the multiple regression method from

Statistica. Neutral is exposure to risk factor innovations within plus or minus half the standard deviation of the sample innovation. Positive or negative refers to innovation outside of this range. Wald test statistics of the null hypothesis are also reported. The Wald formula contains robust X^2 statistics, which show that the coefficients related to neutral, positive, and negative innovations for the relevant risk factor are jointly equal.

Table 7 Non-Linear Risk Exposures

Horizon in weeks	1	2	4	13	52	156
Panel A: SAA						
Interest Rate Exposure						
Neutral	-0.2976#	-0.2976#	-0.2927#	-0.2862#	-0.1453#	-0.1943#
Positive	-0.1488#	-0.1488#	-0.1463#	-0.1431#	-0.0726#	-0.0971#
Negative	-0.0992#	-0.0992#	-0.0976#	-0.0954#	-0.0484#	-0.0648#
Wald	0.0030	0.0030	0.0023	0.0008	0.0065	1.4071
Currency Exposure						
Neutral	-0.4783#	-0.4783#	-0.4834#	-0.4941#	-0.4421#	-0.6206#
Positive	-0.2391#	-0.2391#	-0.2417#	-0.2470#	-0.2211#	-0.3103#
Negative	-0.1594#	-0.1594#	-0.1611#	-0.1647#	-0.1474#	-0.2069#
Wald	0.1012	0.1012	0.1006	0.0985	0.0932	0.4422
Fuel Price Exposure						
Neutral	-0.0116#	-0.0116#	-0.01013#	-0.0105#	-0.0059#	-0.0024#
Positive	-0.0062#	-0.0062#	-0.0058#	-0.0052#	-0.0029#	-0.0012#
Negative	-0.00342#	-0.0042#	-0.0039#	-0.0036#	-0.0021#	-0.0009#
Wald	0.0520	0.0520	0.0423	0.0349	0.0527	0.9168
Adjust R2	0.7726	0.7726	0.7731	0.7792	0.7121	0.7070

Horizon in weeks	1	2	4	13	52	156
Panel B: Comair						
Interest Rate Exposure						
Neutral	-0.0174#	-0.0174#	-0.0161#	-0.0153	-0.0075	-0.0261#
Positive	-0.0087#	-0.0087#	-0.0081#	-0.0076	0.0004#	-0.0130#
Negative	-0.0058#	-0.0058#	-0.0054#	-0.0051	0.0003#	-0.0087#
Wald	2.0489	2.0489	1.8153	1.9452	0.0891	10.0405#
Currency Exposure						
Neutral	-0.0734#	-0.0734#	-0.0748#	-0.0799#	-0.0810#	0.0051
Positive	-0.0367#	-0.0367#	-0.0374#	-0.0399#	-0.0405#	0.0025
Negative	-0.0245#	-0.0245#	-0.0249#	-0.0266#	-0.0270#	0.0017
Wald	59.1175#	59.1175#	62.6710#	73.8910#	67.5470#	0.8594
Fuel Price Exposure						
Neutral	0.00012	0.00012	0.0009	0.00010	0.00015*	-0.0023#
Positive	0.0005	0.0005	0.0004	0.0004	-0.0031	-0.0012#
Negative	0.0001	0.0001	0.0002	0.0002	-0.0017	-0.00010#
Wald	4.1289**,*	4.1289**,*	4.9231**,*	5.8087**,*	13.2682#	57.3572#
Adjust R2	0.3798	0.3798	0.3986	0.5352	0.6612	0.4665

Note: ***, **, and * show that the coefficient is significant at a level of 0.01, 0.05, and 0.10, respectively. # shows that the coefficient is significant at all levels: 0.01, 0.05, and 0.10.

The findings of our research are similar to those of Loudon (2004), presented in Appendix 9. The Wald tests suggest that non-linearity is important for long-term horizon returns, though the findings in the shorter-term rarely exist. For the short-term findings, only four of the twenty-four Wald tests conducted for the horizons up to Week 13 are significant. The results for SAA show that the positive coefficient for joint exposures has no significant effect on the market returns. For the 52 and 156 week horizon lengths, four out of twelve observations of Wald tests are significant. These

findings mainly occur under Comair's section. On the other hand, no significance is found for SAA in any category. Loudon's (2004) research shows that, for the 52 and 156 week horizon lengths, all Wald tests are significantly different from zero at 5% or better, except the interest rate exposure for Qantas, which is not significant at any reasonable level. Therefore, only 24 Wald tests conducted for horizons up to 13 weeks are significant.

In contrast to the zero results for the measurement for SAA in the study, Comair shows a positive and significant coefficient for exchange exposures at all p levels except at Week 156. Under interest rate exposure, Week 156 responds with a positive, significant value. For fuel price exposure, the Wald test shows positive significance at levels of 5% and 10% across the short-term frames. In addition, significance at the 1% level for long-term horizons has also been discovered. It is notable that the significant coefficient shows a large probability value, as the result compares to the non-significant exposures. In contrast, SAA shows no significance in any exposure at any reasonable level.

Comparing the adjusted R^2 between the linear and non-linear specifications, the movements demonstrate similar patterns to each other. The movement shows marginal increases in explanatory power for the horizons up to 13 weeks and a clear change when the time horizon expands. This is especially true for Weeks 52 and 156. It is also notable that Comair has identical adjusted R^2 figures in both the linear and non-linear

expressions⁶³.

Inspecting the coefficients in Table 6 individually shows that the most significant exposures are revealed in the two longest time horizons. Out of 72 coefficient exposures for horizons up to 13 weeks, 57 observations, or 79%, are significant. Comparatively, 29 out of 36 coefficients (81%) based on the 52 and 156 week returns are more significant. Although the differences in between are not tremendous, the findings show that non-linearity is more influential in the longer term. These results correspond to Loudon's (2004) finding, as of the 72 exposure coefficients for horizons up to Week 13, only 15 observations are significant in his finding. In the long-term horizon, 26 out of 36 coefficients are significant. This percentage of deviation is similar to ours.

In the current analysis, we obtained different results than those obtained by Loudon when comparing the individual coefficients in Tables 6 and 7. Our results express several figures where the non-linear exposure coefficient is indistinguishable from zero and non-significant in Table 7, yet significant exposure does exist for part of the range of innovations in the risk factor at linear expression.

Such cases of asymmetric responses are not restricted to any time horizon. Examples in our findings includes fuel price exposure for Comair in Week 52, where the figure is found to be significant with a value of 0.1852 in the linear table but is non-significant

⁶³ Adjusted R^2 is used in multiple regression models to choose the best subset of predictor effects. The formula is calculated as one minus the ratio of the mean square residual over the mean square total. In this case, nothing much differs from the linear and non-linear data; therefore, the figures also change proportionally, leading to similar findings in Tables 2 and 3.

with a figure indistinguishable from zero in positive (-0.0031) and negative movements (-0.0017) in the non-linear expression.

Loudon (2004) suggests that, in order to determine the extent to which exposure to these three risks either improves or lowers returns, one needs to verify how often significant exposures move in favourable directions (Loudon, 2004). Derived from equation (2), Tables 6 and 7 show that the optimal results are those which are positively correlated with the coefficients. Returns are higher if positive exposure to a given risk exists during positive changes in the underlying price, or negative exposure occurs when negative price changes are found.

Table 6 shows the combination of exposures occurring in individual cases, with fuel combined with currency exposure for Comair in the 52 week horizon, though the movement range is small for Comair. These findings do not show a systematic pattern in regards to the movement of returns as expected. The opposite effect, which is the negative impact on returns, occurs in our findings as well. The opposite effect, with a negative impact on returns, occurs in SAA's categories. Significant negatives are found when the factor innovations are positive in interest and currency exposures. Similarly, this combination of exposures is found in Loudon (2004)'s case, with currency exposure for Air New Zealand at the 52 week horizon. For Qantas at the 52 week horizon, both currency and fuel price exposures are significantly negative when factor innovations are positive, and vice versa.

The current chapter details the statistical findings of significant effects of the combined

financial risk exposure impact on SAA and Comair. Linear and non-linear equations enable us to compare the significant levels of our study objects against other international airlines. The coefficients show that our study objects are exposed to similar degrees of risk factors compared to other international airlines. Certain exposure has the same sign as Loudon's (2004) study, which implies that the same risk factor impacts the airline returns in similar degrees.

Chapter 5 serves the purpose of delivering the analytical findings of the financial impact of the risk factors on airline returns. In conjunction with Chapter 4, this study provides a detailed financial overview of SAA and Comair and provides an overview of the degree of impact of certain exposures. In Chapter 6, a review of summary will be presented to provide a complete picture of the current research findings.

Chapter 6. Summary

Chapter 6. Summary

The aim of this study is to investigate the financial impact of selected financial risk exposures on the returns of the airlines under consideration, focusing on an investigation of the correlations of South African-oriented companies with their related economic factors. The reference model we use is that of Loudon (2004), which included a comparison of the linear (market returns against all risk factors) and non-linear risk (exposure is non-linear itself or derives from the hedging activities) equations. Loudon (2004) used this analysis technique and equation to investigate New Zealand Airways, from New Zealand, and Qantas, from Australia. In order to simulate the study by Loudon, the current research replicated the core analysis method and equations, which were simultaneously applied to two South African-based airlines: South African Airways (SAA) and Comair.

A basic historical background is presented for both airlines at the beginning of the analysis in Chapter 2. Both SAA and Comair apply accounting policies in accordance with South African Statements of Generally Accepted Accounting Practice ("GAAP"). As most of SAA's financial transactions are US dollar-denominated, the strengthening of the Rand, as accounted for under SAA's current accounting policies, negatively and significantly influences the operating profit.

The current study includes the comparison of SAA's total return to the shareholders to the returns on S&P figures. The S&P figures show a lesser increase than SAA for the period after late 2001, which can be presumed to be, in part, due to the effect of

September 11, 2001. Although there were no serious influences on the performance of South African airlines following the terrorist attacks in September 2001, the attacks affected the returns of global airlines in general. As a result, SAA showed an unbeatable increase in its returns. Of particular importance is the fact that SAA has access to funds on an annual basis in order to strengthen the response to the risks faced.

SAA's operating costs are mainly composed of fuel costs, research and development expenditures, labour, maintenance material costs, outsourcing of IT support, in-flight entertainment costs, and lease agreements on the aircrafts.

Some of the major challenges SAA faces include fluctuating exchange rates, labour problems, the cost of leasing aircraft, cost of expanding networks, ever-increasing fuel costs, and intense competition in the market.

Comair, which faces similar risks, has struggled in terms of stiff competition in the market. The risks of the financial factors are managed in various ways. For example, interest rate factors are managed by fixing the rate on long-term loans and investing surplus funds with market return yields. Foreign currency risk is managed through forward exchange contracts.

In addition, a brief introduction of the relevant variables, which includes airline returns and financial risk factors, is presented. Relevant literature reviews, which were focused on risk exposure analysis, were conducted and summarised in Chapter 3 of the current paper.

Researchers have investigated various determinants of exposure along with the hedging policies to mitigate exposure, and have shown that the airline sector is one in which corporate hedging could add value by addressing under-investment problems. The major risk exposure factors are the interest rate, the currency factor and fuel costs. It has been suggested that companies implement corporate risk management by modifying their operations, adjusting their capital structure, and using targeted financial instruments.

Interest rate risk is important, as the interest rate is applied in debt finance and affects the liquidity of the company, while borrowing costs are directly related to interest rate changes. Interest rates have significant influence on the general economic conditions and the progression of the business cycle, with consequential effect on consumer demand, especially when demand is cyclical and seasonal, and contains a large tentative component. Higher interest rates may increase expected costs of distress, particularly for the airline industry where leverage is high and distress costs are substantial.

Researchers have pointed out how the economic structure helps to determine the exposure effect of exchange rates on firms. Studies have also demonstrated that net foreign revenues are the main component of a firm's exchange rate exposure. Several studies have confirmed the influence of currency on the airlines, and have shown that foreign activity is significantly related to exchange rate exposure.

Fuel price management is a major factor in financial control of airlines, as jet fuel costs

comprise a significant portion of airline operation costs, at up to 13%. It has been suggested that short-term cash flows could be directly related to changes in fuel prices due to price change inertia. Competition prevents airlines from simply adjusting their fare schedules or seat capacity to compensate for increases in fuel prices. Jet fuel prices may be hedged, which is important considering that airline profitability is reduced by the direct and indirect costs associated with fuel prices.

Studies show that airlines increase value by hedging their jet fuel price exposures. Hedging also allows airlines to fund investment during periods of high jet fuel prices. Hedging on jet fuel prices is effective since this particular exposure is more volatile than prices of other underlying assets, particularly currencies.

A description of the data collection methods and data collected for the variables is presented in Chapter 4 as well as in the figures and appendix, along with an explanation of the highlights and exceptional increases or declines of the trends during the study period. The data were analysed using three methods: financial and operational analysis of the airlines' characteristics, linear risk exposure measurements and non-linear risk exposure measurements.

Figure 6 and 7 contain basic graphs of the airline returns, allowing us to compare this performance during specific time periods. The study reveals that both airlines had a low return on investment performance from 2001 to 2003. This trend, however, corresponds to the trend evident in the performance of the global airlines. On average, 2002 and 2003 were not well-performing periods for international airlines around the globe.

Appendix 3 shows the key variables over the study period, illustrating the patterns of risk factors and their impact on the returns, as well as the likely gains for the airlines from managing these risks effectively.

It is crucial to consider the trends evident in the individual risk factors or exposure variables during our study period, as their movements influence airline returns. As reflected in Appendix 3, the South African interest rate shows a decrease in the long-term horizons, but a sudden rise from mid-2002 to mid-2003. An increase in the interest rate corresponds with a period when the economy was going through a recession before growth was experienced in 2004 and 2005. The currency factor shows unstable fluctuation, which negatively impacts the airlines' financial performances, especially where there are certain transactions in foreign currency, such as foreign sales, overseas expenditures, and overseas airport stop-by and management fees. There is also a constant increase in the price of Brent crude oil and jet kerosene, as a commodity, especially after the terrorist attacks and declaration of the 'war on terror'. All increases in expenses and the depreciation of the currencies would only lead the companies into a future predicament, as far as return on investment is concerned, if the risk hedging instrument were insufficiently manipulated.

The analysis detailed in Chapter 4 commences with a comparison of the characteristics of the airlines, including: foreign sales, fuel cost, gearing, off gearing, interest cover, long-term liability, and revenue seat factor. Major airline characteristics have been calculated by following the example from Loudon's (2004) study.

A summary of the airlines' characteristics reflects the operational performance resulting from the company strategy. The figure shows that Comair was less involved in international operations, so its foreign sales figures are less than those of SAA. This, however, means that Comair is significantly less exposed to the currency risk factor in terms of converting foreign sales to local currency. Foreign sales in 2004 constituted 59% of the total sales of SAA. This figure contributes to the positive return on investment for the airline, provided that there was little fluctuation in the currency exchange at the time. The effect extended to the results for 2005. It is interesting that, although 2002 shows a large percentage of foreign sales, this was also the year in which currency exposure showed tremendous fluctuation and caused a remarkable amount of depreciation in the South African Rand. The combination of results thus brings the return on investment for SAA in 2002 to a serious loss, despite the increase in turnover.

An analysis of the impact of fuel costs reflects certain operational decisions made by the airlines. Comair shows a gradual increase in fuel cost during our study period, which corresponds with the decision they made to purchase a number of jets during the data collection period. The increased portion for fuel for both SAA and Comair reflects the increase in the number of jets, as well as the increase in fuel prices in both local and foreign currencies, using USD as the primary conversion currency. Therefore, the analysis of fuel cost reflects a combined effect of fuel and currency risk factors on the performance of the airlines.

Gearing includes off-balance sheet debt, interest cover, and long-term debts. Gearing is considered to be part of the interest rate factor-related analysis. A huge increase in

gearing, including the off-balance sheet ratio, is found from 2004 to 2005 as the result of a convertible loan made to SAA by Transnet, which could be viewed as equity. The risk-free interest rate enables SAA to cover its interest payable to the debtors, where the interest cover figure shows an increase in 2005. As a result, SAA has high long-term debt in the same year. As Comair did not receive a large loan from a third party, its interest-related analysis shows a lower ratio and lesser degree of changes compared to SAA. Comair made no long-term debt at the beginning, so its interest cover value was high and gearing was low due to the fact that the net debt is low, in regards to the ratio, compared to the equity values.

Unfortunately, revenue seat factors were not exposed and published in Comair's financial statement, but the result for SAA is rather similar to Loudon's findings for both Air New Zealand and Qantas. The figure from Table 1 shows that SAA is still well managed in terms of its sales and seat occupancies, because the percentage of revenue passenger kilometres to available seat kilometres is rather high compared to other international airlines, such as Air New Zealand and Qantas.

The result of the investigation of these characteristics reflects a financial ratio analysis for both airlines, which enables us to understand the aggregate overall performance deriving from the daily operations. The figures for the financial and operational ratios are shown in relation to the airlines' strategic decision-making. However, the results present the few soundly valid ratios, which are not necessarily derived from the most outstanding decision-making or performance but rather from the temporary environmental bubble support. Although the short-term figure may reflect a striking

figure, in the long run, the issue still requires attention, as the origin of the problem still exists. After the ratio analysis, correlations of the airline returns and risk exposures from the data (based on statistical breakdown) are calculated in both linear and non-linear manners.

In order to analyse the close way to Loudon's study (2004), we used a multi-factor analysis equation instead of a single-market factor, which many other researchers have used in the past. Also, to eliminate possible research bias from the collection of data as well as the possible corruption of data, we used both linear and non-linear methods to obtain a comparative result. It is clear that the financial risk exposures of the two dominant airlines in South Africa - SAA and Comair - reflect distinctive findings in both the linear and non-linear specifications. Using both general linearity methods, we identified the return significances on the exposures for interest rate, currency, and fuel price risk over a variety of horizon lengths, which were calculated from July 1998 to December 2005.

The analysis of our findings, as detailed in Chapter 5, shows that the returns of SAA are influenced by the financial risk factors included in the current study, which are significant over most of the return values. As SAA shows financial losses during our period of study, any values on the risk factor would result in an impact on the linear or non-linear inequality, as the result always leads to negative values on the total of the equation. However, there are exceptions which show no significant influence on the risk factors. The horizon may average out the exponential power of the equation, leading to a certain probability level, but not significance. For example, the linear risk

exposure of SAA shows that fuel price exposure does not have a significant influence on the 52nd week horizon. Conversely, Comair shows a significant influence over the same time horizon whilst other fuel exposures show no impact on the airline returns. During that period, jet kerosene shows a small price decrease, which had no significant effect on SAA, but had a positive and significant effect on the returns of Comair.

We also investigated the fact that currency exposure has negative significance during most of the study horizons. The only exception is Week 156 for Comair, which shows no influence during the long-term period. The currency impact on airline returns tends to average out when the time horizon is extended. In addition, the currency depreciated at the end of our research data collection period; therefore, the impact of such a factor is less for our target study airlines. Table 6 shows that SAA is less significantly affected by the currency exposure in Week 156, as the coefficient is significant only at levels of 0.05 and 0.10, whereas other time horizons are negative and significant across the three levels of probabilities. The impact of currency exposure also holds for the returns of Comair, with no impact whatsoever on Week 156.

Loudon (2004) conducted an investigation into the events of September 2001, and the results showed that the events had little discernible effect upon on the exposures we focus in this study. Although this study did not include a comparison of this extraordinary event as an investigation into the consistency of exposure pre-and post-September 2001, the raw data of the exposures did not show deviating figures during the same period. This means that no fluctuation pattern was found pre- and post-September 2001 in the raw data or variables. Loudon (2004) concluded that

stronger evidence has been discovered for exposures when overlapping returns are employed. In other words, from the observations in the pre- and post-periods of September 2001, none of the multi-week horizon exposures were significant using non-overlapping returns, whereas 33 per cent of the exposures were significant using overlapping data for the full sample. Thus, should current study conduct similar investigations in the same manner, the results are predicted to be similar to the outcomes in Tables 6 and 7.

Certain scenarios correspond with Loudon's findings while others are different. In brief, these scenarios are discussed below.

1. As one of the most distinctive findings in this study, the returns of SAA⁶⁴ are significantly affected by all exposures over all time horizons with the exception of fuel exposure in Week 52. This corresponds with the initial estimation, as SAA showed losses during the financial period of 1998 to 2005, which reflects that all exposures influence the negative returns, and vice versa. This indicates that all risk factors significantly influenced financial performance to a certain degree, especially when losses, rather than profits, are shown.
2. Loudon (2004)'s finding states that the short-term returns of Qantas and Air New Zealand are both negatively impacted by the fuel exposure. The returns

⁶⁴ SAA returns are calculated by obtained annual return on investment and average out to become daily data. Daily data then processed into different study period of 1, 2, 4, 13 and 156 week's result which enables the calculation of the correlations with the risk exposures.

for Comair are significantly exposed to fuel price in the short-term, which corresponds with Loudon's findings. However, the exposure is not significant in non-linear models, which becomes prevailing as the horizon length is extended.

3. Adding asymmetric terms does not tend to increase the incidence of significant exposure at the short horizon lengths. Conversely, evidence of non-linearity is slightly stronger for long-term horizon returns. Whereas the non-linearity is found to be significant, it is rare in our case that the sign of the exposure points in a direction which enhances returns.
4. Exposures are more significant over the short-term horizon in the linear equation, with an 8% difference compared to the long-term horizons. This is slightly more so over the long-term horizon, with a 1% difference in individual cases of the non-linear calculation.

To summarise the findings, the results of the analysis show that the airlines examined in this study are more effective in managing their exposures to financial risks in the short-term than in the long-term. In regards to Comair, a financially independent airline operator, the result is rather consistent as it is commonly realised that the hedging instruments are of limited help in managing long-term risks. This is reasonable as long-term events are more difficult to predict. However, this conclusion may be prejudiced, as the short-horizon returns may contain too much noise, such as inflation and domestic GDP, when the airline needs to detect true exposure levels. In addition,

since even the ultimate methods only allow the observation of exposures after hedging, we can only investigate the significance of the risk levels in affecting the airline's return. The extent to which the lack of measured exposure reflects effective risk management is impossible to determine.

Chapter 7. Conclusion

Chapter 7. Conclusion

The South African economy is unique from any other system in the world. This uniqueness derives from the gold boom and economic independency at an early stage in the country's development (Jammine, A. & Bester, M., 2001). The long-term result of this was the transformation of the country's economy to a self-sustained system, which is more dominant than the other main financial bodies in the world, for example, the European financial system or the United States' economy. However, as with all else, the situation presented pros and cons. The independency of the South African economic system may mean that the country has not benefited from the global economic boom, but on the other hand, it is less vulnerable to global economic threats and impact than may be the case for other countries.

The above statement reflects the scenarios of our study objects. The two airline entities show their returns to remain independent of and not influenced by the extraordinary global impact made by the event on 11 September 2001. Although the financial performances of our study objects are vulnerable to the economic factors, the impact and the influences are more severe on the domestic rather than on the international scenarios.

By observing the trend in the financial risk exposures, in addition to the economic analysis from the analysts, it shows that the Brent crude oil and jet kerosene price are predicted to continue to increase. This is as a result of the decrease of petrol refinery production, a decrease in the reserves of the resources, and the fact that fewer new oil

mines have been discovered. Unless a substitute resource is discovered for petrol, human dependencies on petrol will only make the price increase continually.

The South African Rand is also expected to depreciate gradually but continuously. This, however, stimulates and encourages foreign sales as the airlines can profit from the currency fluctuation, excluding the increase of actual foreign sales. But on the other hand, SAA has to pay extra travel allowances or overseas personnel expenditures if the Rand depreciates. However, if SAA operates its foreign transactions, which are based in USD or other currencies, separately before exchanging them in and out of South Africa, the swapping mechanism may help to maximise the airline returns to have strong currency risk exposures. The ultimate option may be if each country or region is capable of operating by themselves in terms of self-sustaining financially, then it can minimise the risk from the currency on the returns as well.

The interest rate variable is a very interesting factor in South African economic system. High interest rates discourage people from investing, while also increasing the chances of liquidation. The prime rate has been predicted to be increased in the near future, following three increases of 0.5 per cent each already this year. This, however, negatively impacts airline returns, as the gearings maybe high and may become a huge proportion of the expenses account. Especially with SAA, loans occupied a large proportion of the liabilities and employee benefit schemes. Thus, an increase in the interest rate will cause the airline to offer lesser returns to the shareholders.

Our study contributes to the results by using a combination of the exposures to

investigate the influence on airline returns. In contrast to most of the similar studies, in which a single extra-market risk was focused on, this study shows more control for the industry effects. In this study, the airlines we examined show results in the short-term, which means that the companies are more effectively managing their exposures to financial risks in short-term than in the long-term. The result, however, corresponds with the usual notion that the using of hedging instruments is of limited help in managing long-term risks, but the effect is more obvious with the short-term exposures. The result of this study corresponds to the results from the study of our reference, as they found that Air New Zealand and Qantas more effectively manage their exposures in short-term than long-term with high significances.

However, in our study, we have found that the result from the short-term horizon returns may contain biased data or other variables, which may influence our analysis when considering the true exposure levels. Variables such as inflation, change of revenue tax structure, change of companies' financial structure, change of hedging instruments used and change of companies' trusts policies will result in so-called noise when statistic analysis is used.

In addition to this, since the data we have obtained is published data which is after-tax and hedged, the analysis method we chose in this study was to accommodate such processed data. Therefore it is not possible to determine the extent to which a lack of measured exposure has showed a greater or lesser reflection of the effectiveness of risk management but rather only on the low or high significant underlying risk levels. In other words, no specific degree of influence or indication of which specific exposure

risk factor would have a specific degree of influence over certain period returns can be determined, as the data was analysed and collected on an aggregate basis. This vague finding derives from the method this study used which our reference, Loudon, discovered in his study, too. Therefore it is recommended that future studies investigate those issues, which are beyond the initial scopes of this study.

In conclusion, the researcher would like to discuss a few critical financial issues for the airlines.

For SAA, although the Transnet Group is financially supporting the company despite its financial losses on the statements, it is recommended, as a crucial point, that the company restructures its system and aims to become self-sustained as soon as possible. As a government-owned airline, it is important for SAA to examine the most critical financial risk factors, which can affect both the success of the company and its financial performance.

For Comair, as a JSE-listed company, the more crucial aim is to ensure the public shareholders can obtain their returns on the investment at the most optimal levels. By doing this, the company cannot avoid the above-mentioned risks for SAA, but at the same time, the airline must also be cautious with regard to the public response towards the image of the company. In addition, since Comair has an operational agreement with British Airways, it is recommend that the airline makes effective use of financial instruments such as hedging and forwarding, to avoid significant losses due to the currency exposures, which may also cause a negative impact on the local fuel prices.

As no company can have full control over the economic risk factors, it becomes crucial for companies to choose the correct instrument to manage these risks and to react appropriately in the case of extraordinary events, which may cause damage to the company.

The King II publication on corporate governance, created in March 2002, has elevated risk management into corporate boardrooms. Risk management must start with a management decision regarding what level of risk the business is willing to tolerate in line with its strategic goals and objectives. The management of risks is a top management responsibility and internal controls must be implemented to effectively deal with the risks identified.

An organisation's greatest asset is its ability to manage the risks it faces and flexibility to meet the demands of a changing and competitive environment. Risk management should be a strategic priority, allowing a company to respond both reactively and proactively to the risks and changes in the market. This means not only managing and mitigating the negative aspects of risk, but also the flexibility to take advantage of the opportunities that arise when risks are faced in the market.

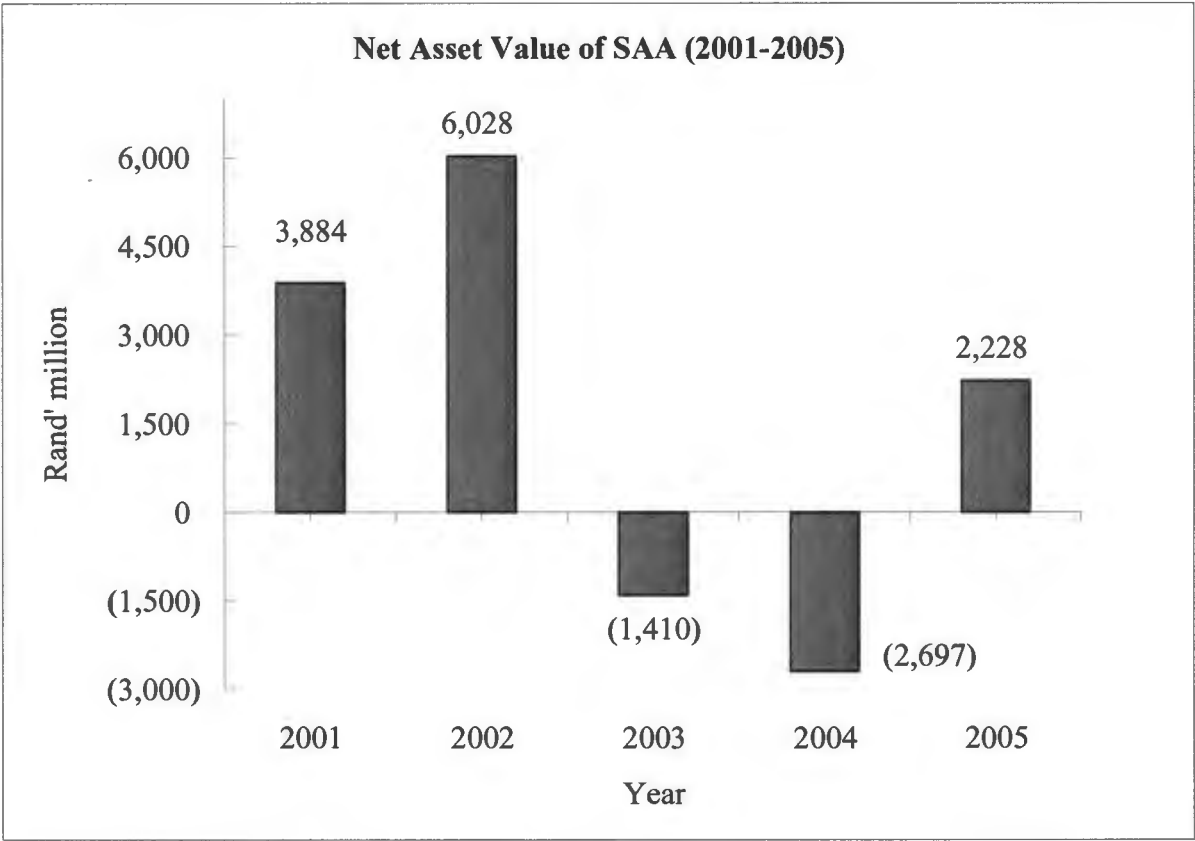
Effective risk management supports informed decision-making, reveals the areas in which there is a strong potential for adverse impact, identifies risk-based opportunities, increases stakeholder confidence, stabilises results by protecting them from

disturbances, improves capital efficiency and reveals opportunities for exploiting natural hedges.

Our study objects would do well to focus on the management of their long-term exposures as well as their short-term exposures, so that the companies do not only mitigate the risks they face, but also ensure the company is in a position to take advantage of the opportunities these risks often contain. Such an approach is important to ensure the long-term sustainability of the company, in an ever-increasingly competitive global market.

Appendix

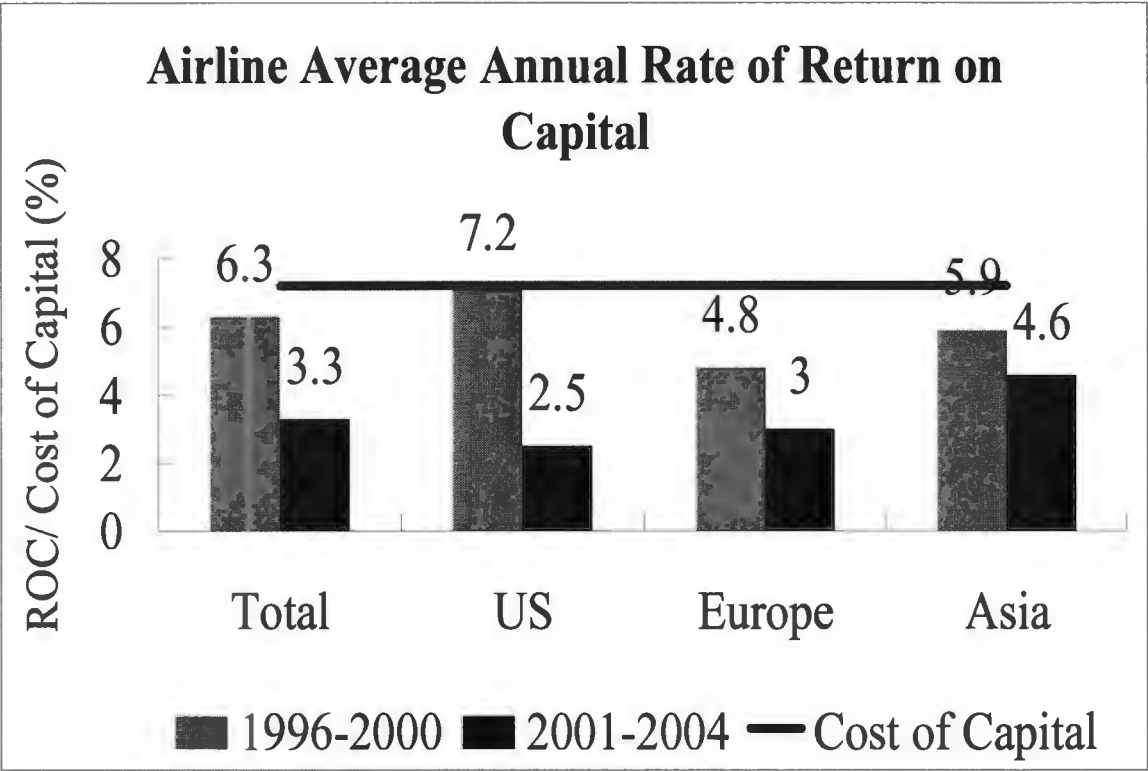
Appendix 1 Net Asset Deployed - Financial Highlight of SAA



* Data extracted from the 2005 Board presentation of SAA's annual report

* Compared to the losses for the previous two years, improvement of asset value increases the value of the shareholders in 2005.

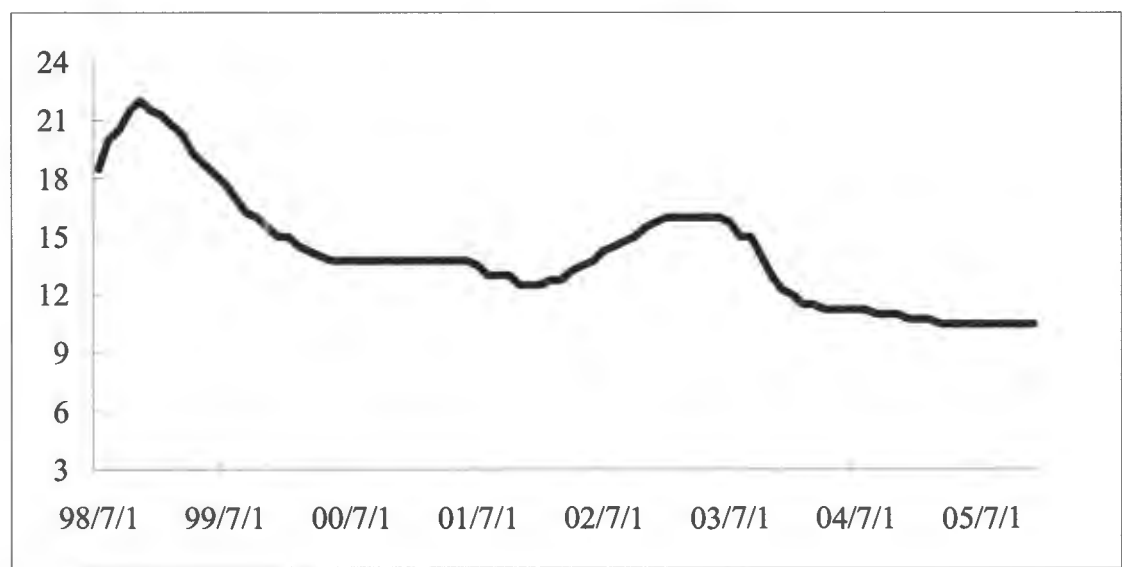
Appendix 2 Airline Average Rates of Return on Capital



* Source: “Value Chain Profitability”, IATA Economics Briefing by Smyth and Pearce (2006)

Appendix 3 Analysis on Financial Risk Variables

3.1 South African Prime Interest rate, % per annum



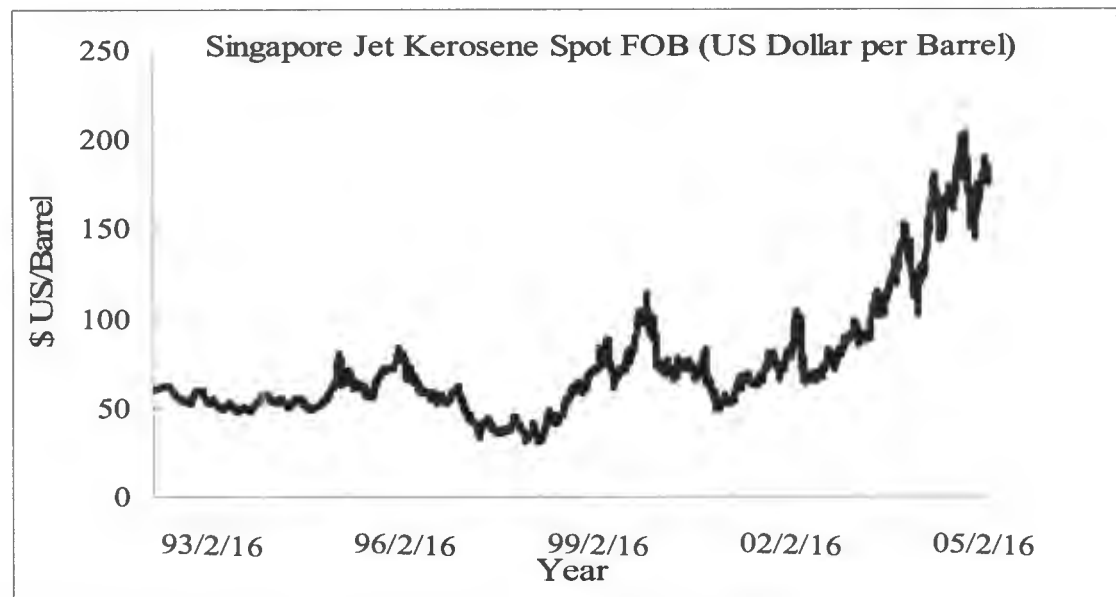
*Source: McGregor BFA Mweb Database (BFA)

3.2 South African R ZAR Mean Closing rate



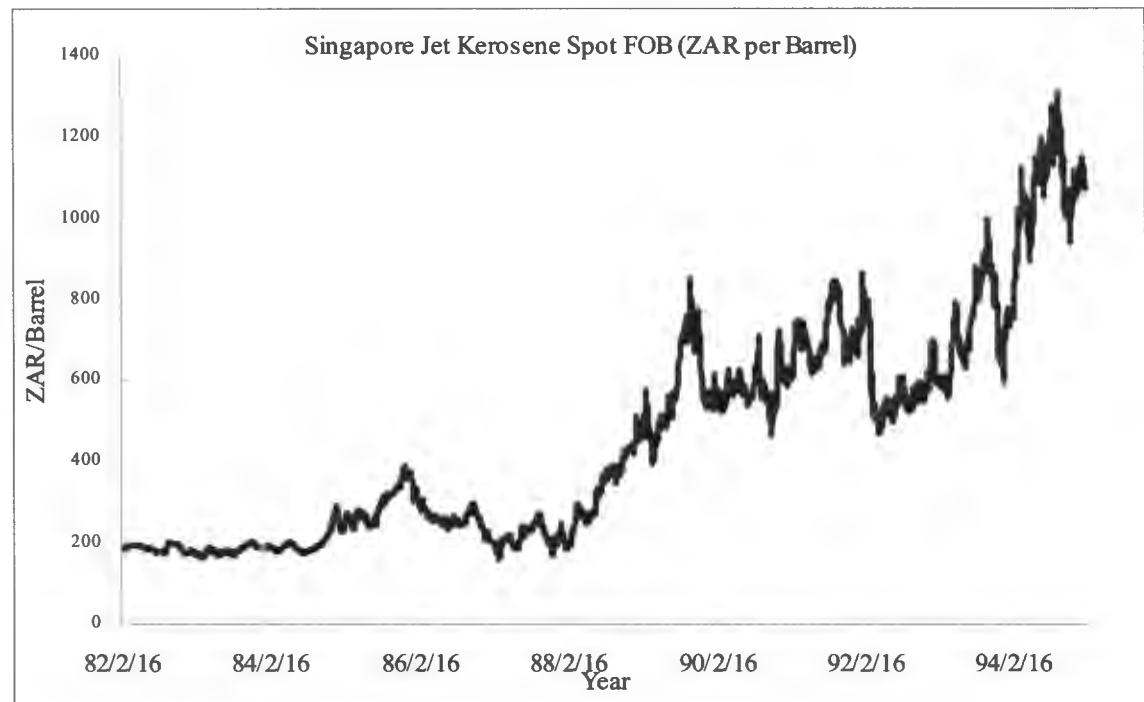
*Source: McGregor BFA Mweb Database (BFA)

3.3 Singapore Jet Kerosene Spot FOB (US Dollar per Barrel)



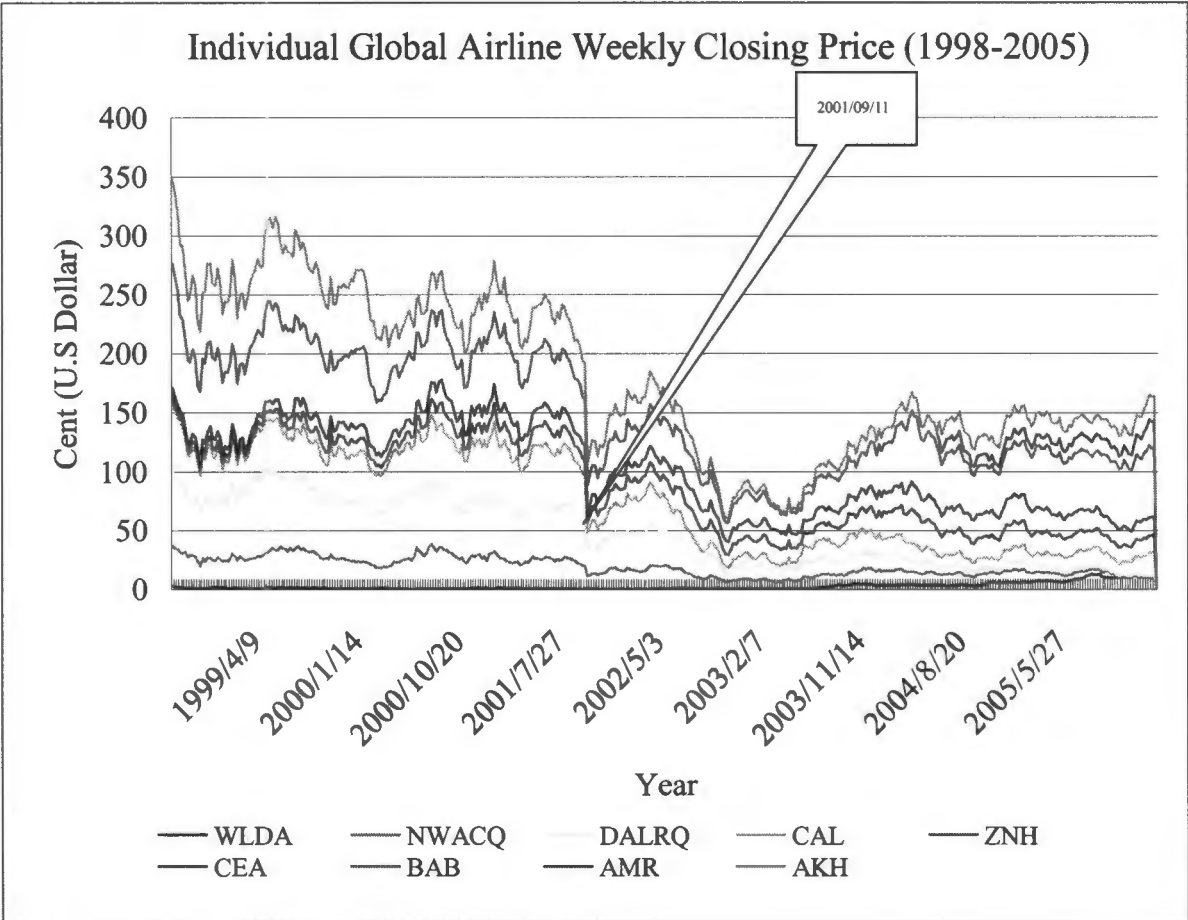
*Source: Energy Information Administration of Energy Statistics from the U.S. Government

3.4 Singapore Jet Kerosene Spot FOB (ZAR per Barrel)



*Source: Energy Information Administration of Energy Statistics and McGregor BFA Mweb Database (BFA)

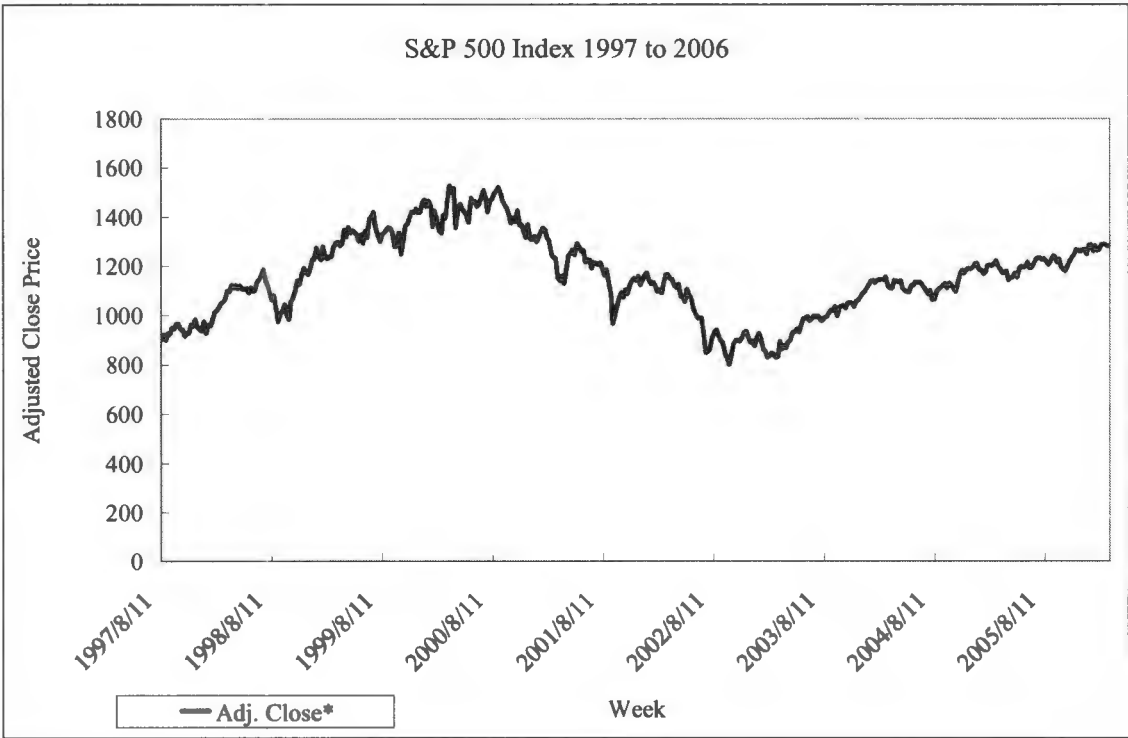
**Appendix 4 Weekly Closing Price of Individual Global Airline Industry shares
in US Dollars from 1998 to 2005**



*Above Weekly Closing Price for the respective Global Individual Airlines are: World Air Holdings (WLDA) , North West Airlines Corp (NWACQ), Delta Airlines (DALRQ), Continental Airlines Class B (CAL), China Southern Airlines Co Ltd (ZNH), China Eastern Airlines Corp (CEA), British Airways (BAB), AMR Corp (AMR) and Air France ADS (AKH).

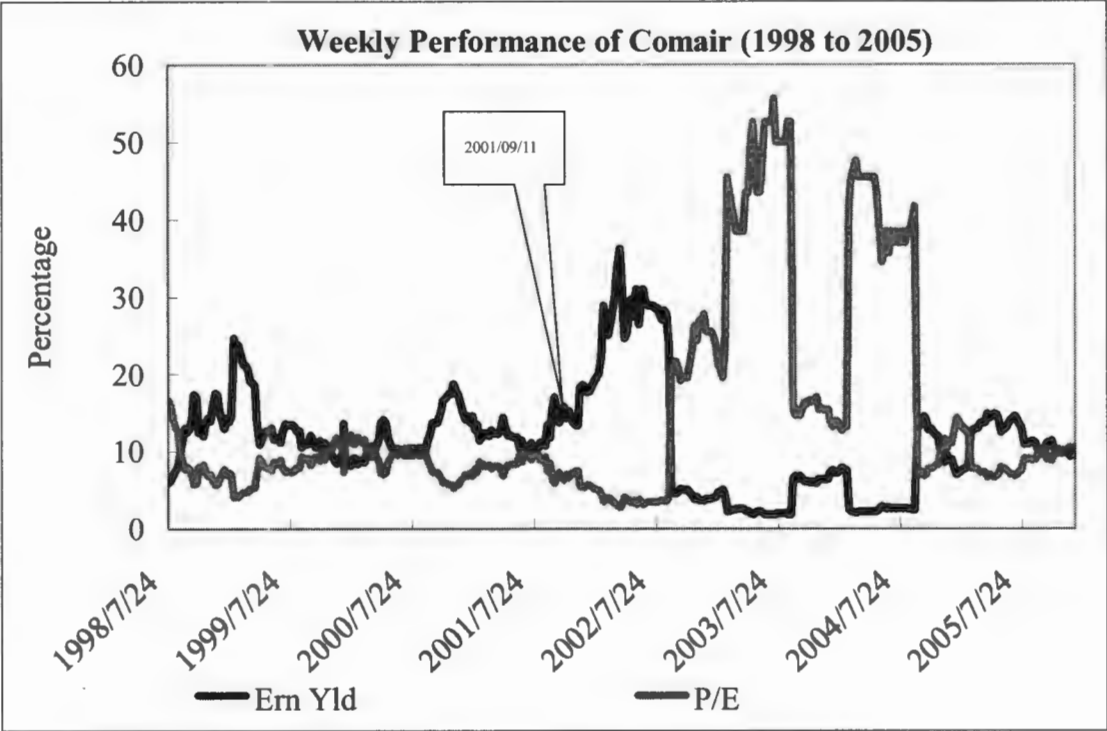
*Source: McGregor BFA Mweb Database (BFA)

Appendix 5 S&P 500 Adjusted Close Index - 1997 to 2006



*Source: Standard and Poors Index Services.

Appendix 6 Weekly Performance of Comair



*Source: Johannesburg Stock Exchange Data Service and Computer Share.

Appendix 7 Airline characteristics on Qantas and Air New Zealand

Foreign Sales is the percentage of total revenue derived from geographic regions outside the domestic country. Fuel Cost is the cost as a percentage of total operating expenditure, excluding depreciation, amortisation and interest. Gearing is the ratio of long-term liability to equity. Off gearing is same as Gearing, except that it also includes the off balance sheet balance. Interest Cover is earnings before interest and taxes (EBIT) divided by net interest expense. Long-term Debt is the ratio of non-current debt to total liability, as recorded in the balance sheet. Revenue Seat Factor is the ratio of revenue passenger kilometers to the available seat kilometers.

Fiscal Year	1996	1997	1998	1999	2000	2001	2002	2003
Panel A: Qantas								
Foreign Sales	44.3	41.7	41.7	42.1	41.1	45.4	37.7	34.5
Fuel Cost	11.8	13.0	12.7	10.7	11.4	15.1	15.8	15.5
Gearing	40	28	20	20	24	28	31	37
Gearing Incl. Off	62	51	44	42	48	55	50	50
Interest Cover	4.9	5.2	5.6	7.6	7.9	7.0	14.1	8.8
Long-term Debt	95.3	82.7	93.0	83.8	81.3	70.7	81.0	84.7
Revenue Seat Factor	78.8	78.0	72.1	73.4	75.6	76.1	78.6	78.3
Panel B: Air New Zealand								
Foreign Sales	78.8	78.6	78.0	79.1	80.5	88.8	77.7	76.8
Fuel Cost	n.a.	n.a.	13.6	11.8	15.7	17.4	18.0	17.9
Gearing	16	29	36	35	66	87	47	23
Gearing Incl. Off	n.a.	52	53	56	76	93	74	65
Interest Cover	69.2	11.1	4.2	3.5	3.0	-0.2	-0.4	17.8
Long-term Debt	72.8	82.9	86.1	87.7	68.5	76.0	91.0	89.3
Revenue Seat Factor	67.7	68.5	67.6	67.9	69.7	71.6	72.3	74.4

*Source: Loudon (2004)

Appendix 8 Linear Risk Exposures by Loudon

This table reports exposure coefficients for interest rate, currency and fuel price risk as estimated from the linear regression equation (1) for selected multi-week horizons. Numbers in parentheses are Newey-West robust standard errors. Rows labeled Wald contain robust χ^2 statistics from the Wald test of the null hypothesis that the fuel, currency and interest rate coefficients in equation (1) are jointly zero. The last row gives the number of observations.

Horizon in Weeks	1	2	4	13	52	156
Panel A: Qantas						
Interest Rate Exposure	0.059 (0.100)	0.206** (0.096)	0.258** (0.121)	0.307 (0.205)	0.829*** (0.260)	0.488* (0.292)
Currency Exposure	0.042 (0.170)	(0.001) (0.181)	0.098 (0.266)	0.282 (0.419)	1.069* (0.639)	0.428 (0.284)
Fuel Price Exposure	(0.057) (0.044)	(0.098)** (0.041)	(0.069) (0.055)	(0.037) (0.092)	(0.404)*** (0.123)	(0.333)*** (0.084)
Wald	2.181	12.134***	7.207*	5.385	61.245***	26.633***
Adjusted R ²	0.086	0.123	0.125	0.191	0.534	0.679
Panel B: Air New Zealand						
Interest Rate Exposure	0.111 -0.172	0.172 -0.144	0.254 -0.155	0.03 -0.278	-2.248** -0.946	-2.951*** -0.752
Currency Exposure	0.211 -0.36	0.739 -0.653	1.371* -0.803	1.480** -0.735	0.997 -0.89	-3.765*** -0.294
Fuel Price Exposure	-0.132** -0.063	-0.079 -0.08	0.02 -0.115	0.165 -0.198	0.915* -0.488	-0.093 -0.196
Wald	8.404**	6.642*	6.447*	5.003	8.062**	461.78***
Adjusted R ²	0.145	0.171	0.201	0.16	0.35	0.783
Observations	412	411	409	400	361	257

Note: ***, ** and * Significant at the 0.01, 0.05 and 0.10 levels, respectively.

*Source: Loudon (2004)

Appendix 9 Non-Linear Risk Exposures

This table reports exposure coefficients for interest rate, currency and fuel price risk as estimated from the non-linear regression equation (2) for selected multi-week horizons. Numbers in parentheses are Newey-West robust standard errors. Neutral is exposure to risk factor innovations within plus or minus half the standard deviation of sample innovations. Positive/Negative refers to innovations outside this range. Rows labeled

Wald contain robust χ^2 statistics from the Wald test of the null hypothesis that the exposure coefficients related to neutral, positive and negative innovations of the relevant risk factor are jointly equal. The last row gives the number of observations.

Horizon in Weeks	1	2	4	13	52	156
Panel A: Qantas						
Interest Rate Exposure						
Neutral	-0.257	0.785*	-0.437	0.634	1.057**	0.146
	-0.512	-0.427	-0.533	-0.723	-0.423	-0.344
Positive	0.021	0.268*	0.588***	0.785**	0.923***	0.13
	-0.17	-0.157	-0.2	-0.343	-0.221	-0.084
Negative	0.078	0.06	0.018	-0.011	0.776**	0.454
	-0.168	-0.157	-0.173	-0.245	-0.309	-0.279
Wald	0.09	0.331	4.815**	1.073	0	0.344
Currency Exposure						
Neutral	-1.209	1.734**	-0.111	0.19	2.218	-1.984***
	-0.873	-0.861	-0.815	-1.198	-1.535	-0.559
Positive	0.26	0.44	0.649*	0.055	-2.229**	2.244***
	-0.326	-0.364	-0.384	-0.77	-0.987	-0.485
Negative	-0.066	-0.405	-0.421	0.289	2.245***	0.738**
	-0.29	-0.26	-0.436	-0.543	-0.375	-0.312
Wald	2.188	0.13	2.163	0.036	31.161***	71.904***
Fuel Price Exposure						
Neutral	-0.183	-0.330	-0.146	-0.349*	-0.220	0.536***
	-0.233	-0.242	-0.221	-0.188	-0.224	-0.18
Positive	0.047	-0.018	-0.077	-0.007	-0.696***	-0.410***
	-0.078	-0.066	-0.078	-0.106	-0.12	-0.13
Negative	-0.154**	-0.138**	-0.031	-0.047	0.159*	0.186*
	-0.07	-0.068	-0.093	-0.149	-0.083	-0.096
Wald	2.438	2.357	0.005	1.603	13.462***	113.52***
Adjusted R ²	0.085	0.136	0.14	0.202	0.669	0.755

Horizon in Weeks	1	2	4	13	52	156
Panel B: Air New Zealand						
Interest Rate Exposure						
Neutral	-0.370	0.498	0.557	1.011	-2.124	0.458
	-0.461	-0.636	-0.729	-1.178	-1.397	-0.378
Positive	0.132	0.118	0.123	0.573	-0.028	-5.095***
	-0.255	-0.232	-0.326	-0.481	-0.994	-0.447
Negative	0.182	0.246	0.357	-0.474	-2.472***	-1.873***
	-0.312	-0.225	-0.243	-0.403	-0.551	-0.278
Wald	0.325	0.316	0.403	0.129	9.903***	124.29***
Currency Exposure						
Neutral	-0.644	0.022	2.139*	5.225*	-9.494***	-3.789***
	-1.02	-1.246	-1.287	-2.757	-1.985	-0.723
Positive	-0.302	-0.198	0.948*	3.088**	3.239**	-1.518*
	-0.399	-0.57	-0.55	-1.411	-1.431	-0.786
Negative	0.66	1.402	1.706	-0.619	-1.305**	-4.199***
	-0.619	-1.218	-1.57	-0.753	-0.587	-0.525
Wald	0.241	0.874	0.463	0.457	35.496***	5.704**
Fuel Price Exposure						
Neutral	-0.086	-0.014	0.217	-0.895***	1.514*	0.493*
	-0.369	-0.376	-0.24	-0.324	-0.83	-0.285
Positive	-0.204**	-0.158	-0.121	-0.026	0.03	-0.225
	-0.091	-0.114	-0.138	-0.157	-0.268	-0.153
Negative	-0.077	-0.029	0.118	0.36	1.513***	-0.280***
	-0.096	-0.103	-0.164	-0.306	-0.457	-0.074
Wald	0.275	0.284	2.905*	0.833	10.117***	6.392**
Adjusted R ²	0.141	0.173	0.199	0.214	0.538	0.858
Observations	412	411	409	400	361	257

Note: ***, ** and * Significant at the 0.01, 0.05 and 0.10 levels, respectively.

*Source: Loudon (2004)

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